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THE AUTOMOBILE AND MOTOR REVIEW

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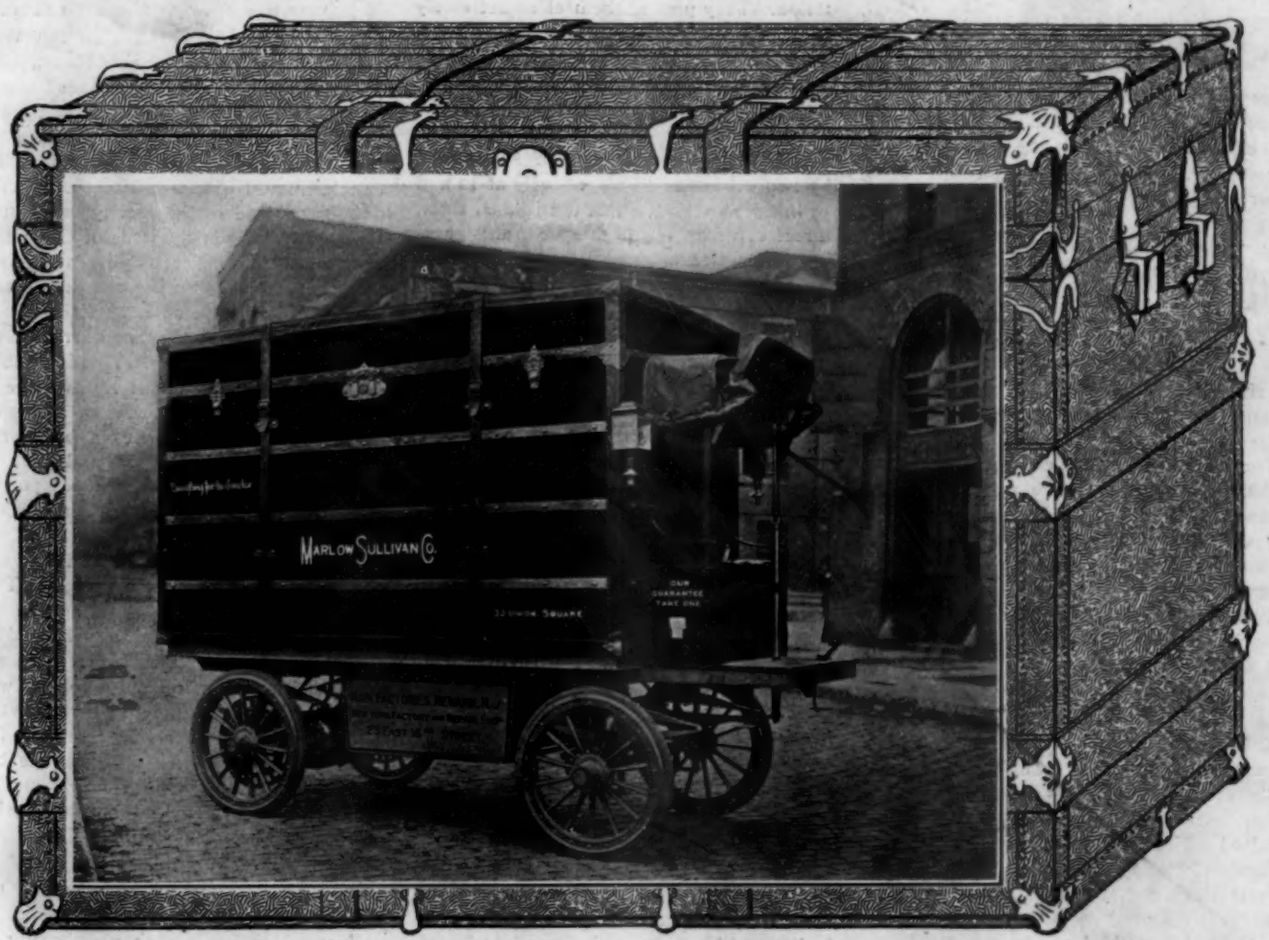
22 1902

Trade Uses For Automobiles.

THE manner in which the electric delivery wagon can be turned to account as a valuable advertisement that adds nothing to the cost of running expenses is illustrated by the curious trunk wagon put into commission by the Marlow Sullivan Co., manufacturers and wholesalers and retailers of trunks, traveling bags and other leather goods, New York. The wagon is one of the Vehicle Equipment Co.'s electric vehicles, illustrated and described in detail in this paper of the issue of August 16 last. It is guaranteed to carry 2,000 pounds. The body was built, of course, to the special order of the Marlow Sullivan Co., and is the novel and striking feature which gives the wagon its great value for advertising purposes.



ELECTRIC VEHICLE BODY MADE TO RESEMBLE A TRUNK FOR ADVERTISING PURPOSES.

When asked concerning the performance of the vehicle, Mr. Sullivan said:

"The wagon makes an average daily mileage in the busy season of about fifty miles. It makes two trips a day, stopping at noon at the station to recharge. The near by deliveries are made early, so that the battery is only partially discharged by noon, and can be recharged fully in two hours. In the afternoon longer trips are made, to Harlem, as there is more time for recharging the battery at night. Most of the work is done in Manhattan, and the wagon seldom goes off the island except for an occasional trip to our factory in Newark, New Jersey.

"The capacity of the wagon is thirty ordinary trunks, or fifty small ones."

"How do you find the cost of operating compares with the expense of horse-drawn wagons?" inquired the newspaper man.

"I can't give you any exact figures as to that," replied Mr. Sullivan. "Before we got the electric wagon we had all of our delivering done by the express company, at an average cost of $10 a day. The cost of operation of the new wagon, including wages of the operator, storage, recharging and battery maintenance, will probably average about $5 a day. The wagon has been out of service only once since we got it in June. The batteries were then overhauled and put in good condition. The bill for that has not come in yet, so I do not know how much it is. The Rainier Company, however, will contract to maintain the batteries in first class condition for five years at a cost of $300 a year, making an average of one dollar a day, exclusive of Sundays and holidays. We have not made such a contract yet, but I think we shall do so.

"When depreciation of batteries and wear and tear on the vehicle itself are figured in, it may bring the cost up to about the same as we were paying the express company, but we got the wagon more for the advertising than for economy in the work, and even if there is no saving in the expense of delivering goods, we will get a lot of advertising at no cost."

Notes of General Interest.

In the smaller cities the interest in automobiling is keeping pace with the progress in the larger cities. A dispatch from Torrington, Conn., for example, announces the ownership of twelve vehicles in that town. The pioneer is W. W. Mertz, who has had a Stanley steam car for about two years. The Locomobile is well represented, Messrs. Porch, Parker, and Roswell having cars of this type. Of gasoline machines, there are included a Knox and a Gasmobile.

An astonishing number of automobiles have been disposed of by raffling at 10 cents per ticket at church fairs, bazaars and Elks' carnivals throughout the middle and western States. Only in a very few instances have the county attorneys raised objections based on the Federal statutes relating to lottery schemes. Automobiles listed at from $500 to $800 have frequently netted 50 per cent. higher figures by this method.

The principal advantage which the horse still retains over the automobile is that it can be turned loose in a pasture when in need of repairs, and in most cases Nature will succeed in doing the work in a few weeks without putting anybody to the inconvenience of thinking over how the job should be done.

Ward Leonard Gasoline Touring Car Discussed Critically.

BY HERBERT L. TOWLE.

The Ward Leonard light cars, lately known as the Knickerbocker cars, have stood in this country as the nearest representative of the Renault machines which have attained so high a reputation in France. They are, in fact, patterned after the latter as closely as the altered conditions in this country of road service and materials of construction would permit. They have retained in their entirety the four leading features of the Renault design—the jointed shaft and bevel gear drive, the cutting out of all gears on the high speed, so that not even an idle pair of gears runs in mesh, the system of meshing the gears by the tips of the teeth instead of by their ends, and the "thermos-phon" or gravity system of water circulation. They proved themselves extremely fast and efficient, but their short wheel base and the defects of the Renault system of meshing the gears placed them rather outside of the trend of progress in this country.

These machines have been superseded by two others, rated respectively at 10 and 15 horse power, in which the jointed shaft, direct drive on the high speed, and gravity water circulation have been retained, but in which sliding gears of the usual plan are adopted and in which many changes of detail unite to produce an abler and much more generally acceptable machine.

The 10 horse power machine, which is shown in Fig. 1, has a single cylinder De Dion motor of 110 mm. bore by 130 mm. stroke, or approximately 4.3 by 5.08 inches. This is a new size of this make of motor, which has just been produced by the French firm. It has a normal maximum speed of 1,400 revolutions a minute, at which speed the car is geared to 26 miles an hour, on the direct drive. Its weight is 1,550 pounds, indicating a relatively more substantial construction than in the previous models. It has a wheel base of 75 inches, and a gauge of 47 inches from center to center of tires. The body space conforms to the standard French chassis dimensions.

THE RUNNING GEAR.

Taking the running gear first, we find the customary semi-elliptic side spring suspension, the front springs being 33 1-2 inches long and the rear springs 39 inches, with about 3 inches margin of compression when normally loaded. The wheels, though tubular in the photographs, are now made of wood and have 28 by 3 inch G & J clincher tires. The main and false frames are both built up of substantial steel tubing, the joints being made up with cast steel sockets bored and brazed. This makes a rather expensive construction, this being the largest American machine with which the writer is acquainted in which the tubular frame is used. The spring brackets and "pump handles," like the sockets, are steel castings, all but the pump handles being cored. The latter also were originally cored, but it was found impossible to get reliable castings when this was done. The front axle is composed of a tube brazed into drop forged yoke ends for the steering knuckles. The spring seats also are forged on these yoke ends, so that the front axle is in no danger of twisting inside the spring clips or of breaking the latter, as sometimes happens when the spring is attached directly to the ordinary round or square axle.

TRANSMISSION SYSTEM—THE CLUTCH.

The transmission system of the Ward Leonard car is of special interest, comprising as it does in clutch, speed changing system, and propeller shaft, a number of interesting and attractive features. It is shown complete in Figs. 3 and 4. The clutch, instead of being, like the Renault, of the enclosed or internal type, like that shown in page 3 in the issue of October 11 of this publication, accomplishes the same result—having the spring thrust self-contained when the clutch is in action—without departing from the usual arrangement of the frictional surfaces. This is done by prolonging the crankshaft *A*, as made by the De Dion Co., by means of a screwed extension *B*, which carries a ball thrust bearing adjustable forward and back by the slotted nut *C*. The male portion *D* of the clutch has a very large hub, which turns loosely on the flywheel hub *E*, and contains a deep annular groove into which the compression spring *F* is slipped. Thus the spring, bearing as usual against the male portion of the clutch, is backed by a thrust bearing connected mechanically with the female portion and revolving with it instead of being supported by an external stationary member. From this it follows also that the two plates of the ball thrust bearing have no relative motion when the clutch is engaged, thus saving a great deal of wear on this rather uncertain part of the machinery.

The hub of the male portion of the clutch expands into a wide flange at *G*, against which bears a simple thrust ring (not shown), actuated by a forked arm on a rock shaft immediately above, this being actuated through a sort of toggle arrangement from the customary clutch pedal to release the clutch. As the clutch, when released, ordinarily soon comes to rest, a ball thrust is not considered necessary at *G*.

An unusual feature of the clutch is the wide ratio of movement between the clutch pedal and the clutch itself, the reduction being as 40 to 1. This requires a considerable motion of the pedal to insure the clutch against sticking, but it enables the operator to engage the clutch as gradually as he pleases, and for this reason, and possibly also because of the careful workmanship of the clutch itself, it is possible to start the machine direct on the high gear when the road is level, by engaging the clutch very slowly. The clutch is lubricated through the oil tube *H*.

To insure against binding of the motor or speed gear shafts, a loose jaw coupling *I* is interposed between the clutch and the first gear shaft *J*. This shaft has cut on it two pinions *K L*. A second shaft *M*, in line with the first, carries at its rear end the pedal brake drum *N* and one-half of the universal joint *O*. For the direct drive, the shaft *J* is shifted backward about 3-8 inch in its bearings, by means of a forked arm *P*, so as to engage the loose jaw *Q*.

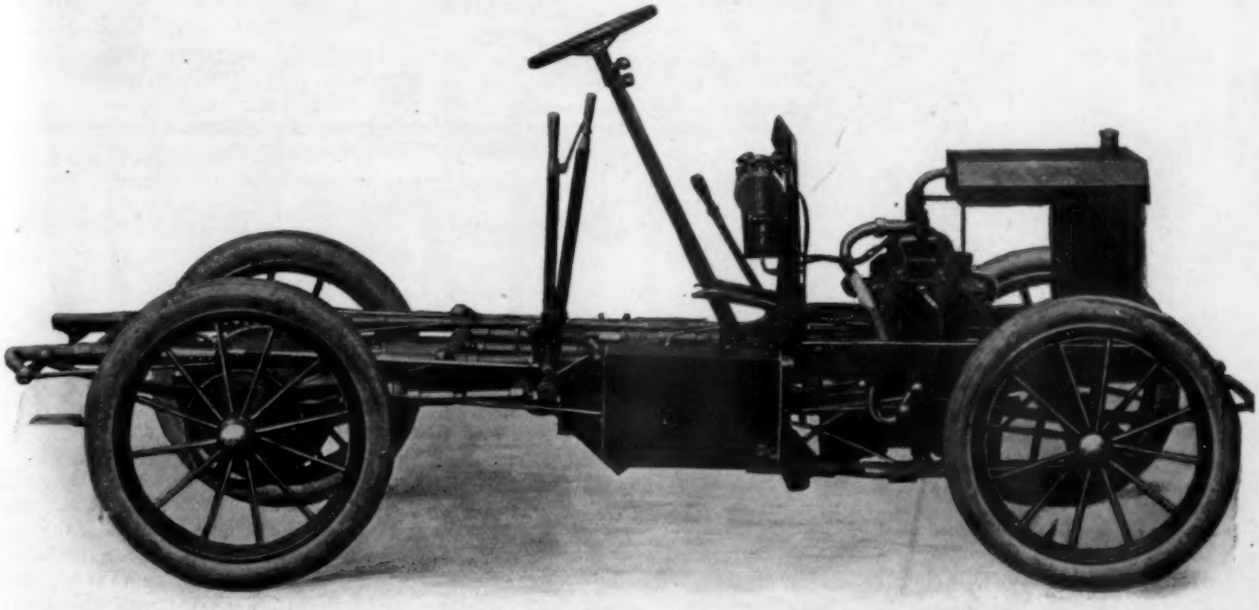


FIG. 5.—SIDE VIEW OF 15 H.-P. WARD LEONARD CAR WITHOUT BODY OR MOTOR BONNET.

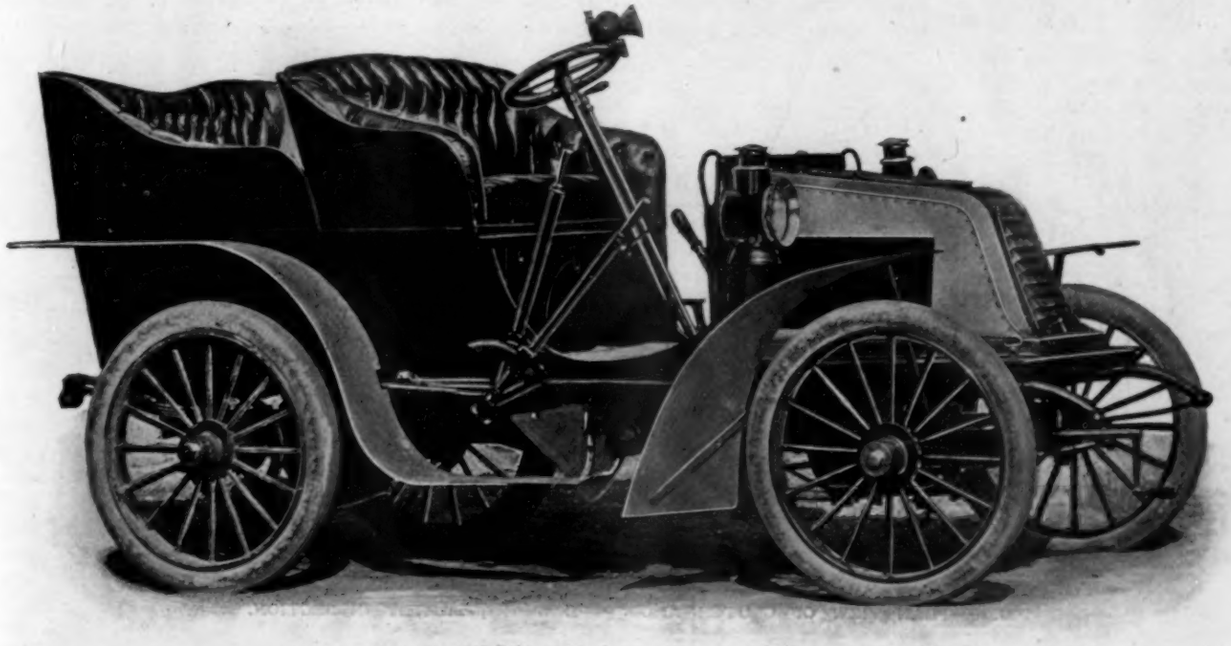


FIG. 1.—WARD LEONARD 10 HORSE POWER GASOLINE TOURING CAR.

THE SPEED GEARS.

The first and second speeds are obtained by shifting the shaft *R*, on which are cut the gears *S T U*. The first of these meshes with pinion *K* or *L*, which are precisely alike, while pinions *T* and *U*, meshing with corresponding gears cut on *M*, give the first and second speeds respectively. The shifting is accomplished by the forked lever *V*, whose short arm carries a roller working in the cam slot *W* on shaft *X*. This shaft is actuated by the speed changing lever, which carries a spur gear sector meshing with a pinion on the outer end of the shaft *Y*.

Reversal is accomplished through a shaft parallel with *R* and carried in bear-

ings in the cover of the gear case. It has two gears, one of which, when the shaft is shifted for the reverse, meshes with a wide-faced intermediate pinion in constant mesh with the largest gear on shaft *M*, while the other meshes with pinion L. This shaft is shifted by the double cam Z.

The propeller shaft contains one special feature—the use of a breaking piece of square steel *A* (Fig. 4) to protect the remainder of the transmission system. This piece connects the internally squared sections *B B*, whose open ends are surrounded by the tube *C*. In case piece *A* breaks, it may be removed at once by taking the screws of the rear universal joint and lowering the latter clear of the rest of the machinery. The universal joints themselves are made with enclosing shells, between which are inserted dust rings *D*, of felt. It is noticeable that this same care in excluding dust extends to every other part of the transmission system, including both the speed gear box and the rear axle.

THE REAR AXLE.

The steel casing *E*, surrounding the bevel gear drive, is outwardly of conventional form. A special feature, however, is the provision made for taking up wear in the bevel gears by lateral shifting of the bearing casting *F*, which is backed by the set screw *G*. Although this adjustment is not quite theoretically correct, it is much better than the commoner method of shifting the bevel pinion *H* backward along its own axis. As the drawing shows, the casting *F* is formed to provide two bearings for the pinion shaft, and it may be removed by disconnecting the propeller shaft and removing the nuts on the studs *I*.

The differential is of the spur gear type, and the thrust reaction of the bevel gear *J* is taken by a ball thrust bearing *K*. American Roller Bearings are provided one on each side of the differential at *L M*. Substantial tubes *N N* inclose the shafts *O O*, which turn loosely in the elongated hubs of the casing *P*, and whose inner ends are squared to carry the principal gears *Q Q* of the differential.

These shafts extend right through the artillery wheel hubs *R*, and the ends of the shafts are squared for a length of about 2 1-2 inches to carry the hubs. The tubes *N N* do not go through the hubs, but terminate in the castings *S*, which contain the ball bearings *T*, and also afford seats *U* for the rear springs, which in the drawings are shown rotated 90 degrees backward from their proper position on top. By this construction the weight of the vehicle is carried primarily by the shafts *O O*, instead of by the sleeves *N N* alone. This requires that the shafts be more substantial than would be necessary if they transmitted the driving force alone, but it makes the use of anti-friction bearings much easier. The balls employed are 5-8 inch in diameter, and the double row employed should afford liberal carrying capacity.

The hub brake drums *V*, as shown, are acted on by leather brake bands, operated by a hand lever working over a notched sector in the usual manner. The brake bands are not equalized, but have separate adjustments. The brake on the transmission shaft has double-acting metal jaw shoes.

The steering gear is on the rack and pinion order, but to accommodate the slope of the steering column the teeth of both rack and pinion are cut askew, making the latter somewhat resemble a spiral gear. The connection between the rack and the right steering knuckle contains a spring cushion, which relieves road shocks and automatically takes up its own wear as well.

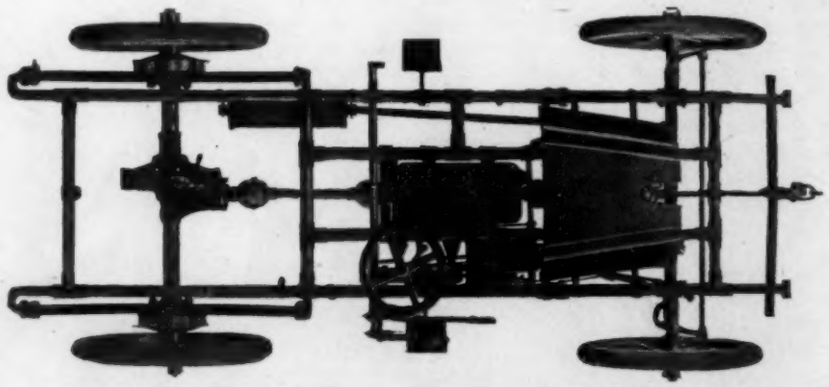


FIG. 2.—PLAN VIEW OF WARD LEONARD TOURING CAR STRIPPED.

THE COOLING SYSTEM.

The gravity system of water cooling, which has found but little favor on most French and later American machines, appears in the Ward Leonard to have been worked out with complete success. The essential requisite in this system is not, as many people have rash'y concluded, an abundant water supply, but a very liberal passage for the flow of the water. As the sole reliance for circulation is the difference in density between the water emerging from the engine jacket and that emerging from the cooling coils, it should be evident that what is sacrificed in pressure should be made up in shortness and larger

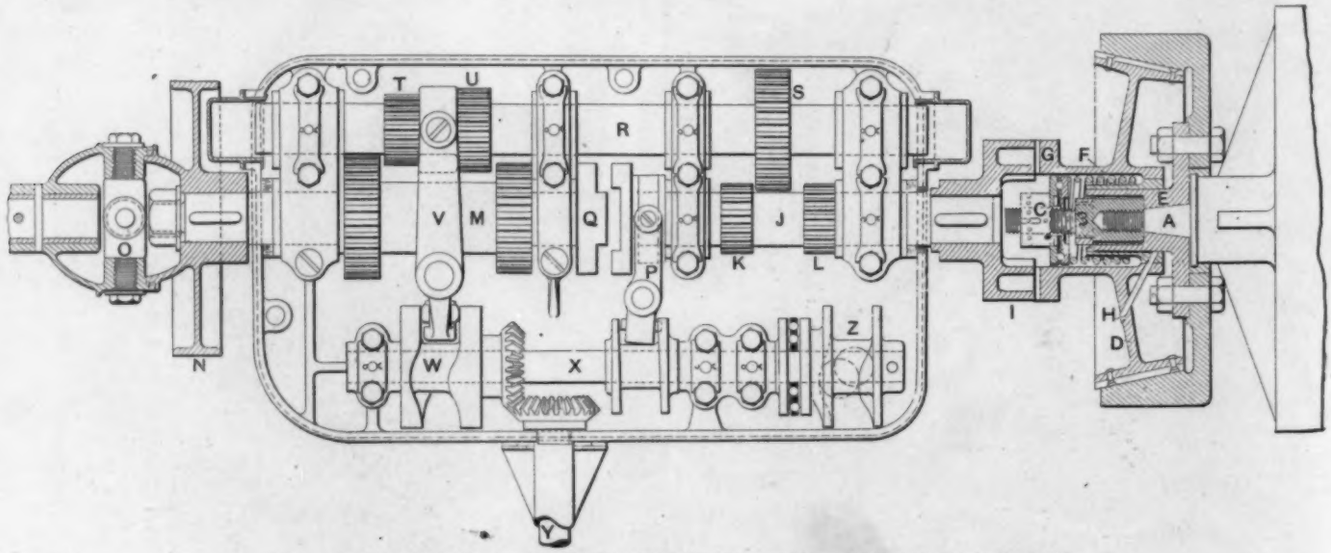


FIG. 3.—PLAN VIEW OF CLUTCH AND SPEED GEARS, PARTLY IN SECTION.

diameter of the piping, to insure an abundant flow. In the Ward Leonard car the tank holds but 5 gallons, and the jacket and piping about two more; but the tank is directly above the motor, and the water, instead of passing through all the radiating coils in series, divides and goes through them in multiple. Moreover, there are no less than four separate pipes connecting the bottom headers of the cooling coils with the jacket. A single large pipe, however, is deemed sufficient for the return to the tank. In practice it is claimed that the water never boils under the most adverse conditions, and it certainl, does not in ordinary touring, which is more than can be said of some machines with pumps.

One result, and an important one, of using this system is that the motor can never become overheated by a stoppage of the pump, and consequently the exhaust valves never become burnt. Mr. Leonard assured the writer that the grinding in of burnt exhaust valves is a performance absolutely unknown in his shops.

Among the minor details of the car may be noted an ingenious swinging bracket to carry the starting crank. The motor shaft is so low that the starting crank must be carried higher than the crank shaft, but instead of using a sprocket chain, a swinging bracket is employed, which latches up close to the frame when the crank is not in use. Another feature is the use of a twisting handle on the gear shifting lever, to release the latch, in place of the button or spoon blade arrangements more commonly used. It certainly has advantages over the button, at least.

As above stated, the maximum speed of the machine is 26 miles an hour on the level, and it will ascend a 3 1-2 per cent. grade in the direct gear. At the same motor speed (1,400 revolutions per minute) the first and second speeds are 6 1-2 and 12 miles an hour. On these gears it will take 20 and 8 per cent. grades, respectively, with four passengers.

The 15 horse power machine referred to in the second paragraph is of substantially identical design with the 10 horse power car mechanically, except that it has a 7 foot wheel base. The motor is a double cylinder Buchet, with cylinder dimensions about 100 by 110 mm. It is shown without the body and motor bonnet in Fig. 5. Owing to the form of the motor, it is more convenient to locate the cooling coils in front, and this, with the shape of the tank just above, results in a bonnet of the square Mercedes pattern.

In both the 10 and 15 horse power machines illustrated, the reverse is actuated by a separate lever in front of and to the left of the steering column, but this is discarded in the newest types of the machines, and all the speeds and the reverse are operated by the single side lever. The 15 horse power machine, like the 10 horse power, has three forward speeds, the highest of which is given as 32 miles an hour.

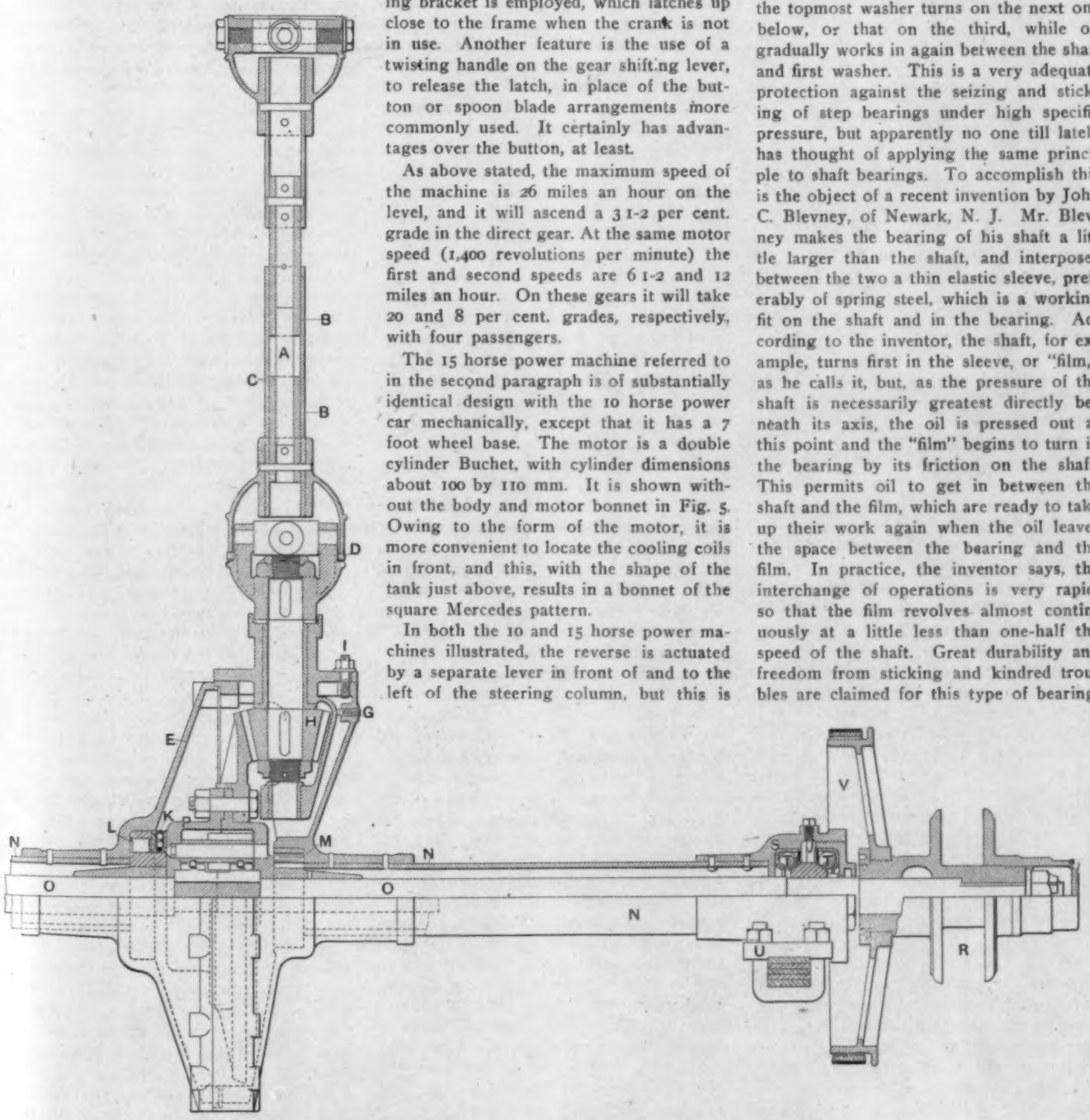


FIG. 4.— PROPELLER SHAFT AND REAR AXLE, PARTLY IN SECTION.

Blevney Film Bearing.

Mill engineers who have to do with vertical shafts have for some time used a form of step bearing in which the lower end of the shaft rests on a pile of superposed thrust washers, the whole running in a bath of oil. This permits the shaft to turn on the topmost washer till the oil has been partly squeezed out, after which the topmost washer turns on the next one below, or that on the third, while oil gradually works in again between the shaft and first washer. This is a very adequate protection against the seizing and sticking of step bearings under high specific pressure, but apparently no one till lately has thought of applying the same principle to shaft bearings. To accomplish this is the object of a recent invention by John C. Blevney, of Newark, N. J. Mr. Blevney makes the bearing of his shaft a little larger than the shaft, and interposes between the two a thin elastic sleeve, preferably of spring steel, which is a working fit on the shaft and in the bearing. According to the inventor, the shaft, for example, turns first in the sleeve, or "film," as he calls it, but, as the pressure of the shaft is necessarily greatest directly beneath its axis, the oil is pressed out at this point and the "film" begins to turn in the bearing by its friction on the shaft. This permits oil to get in between the shaft and the film, which are ready to take up their work again when the oil leaves the space between the bearing and the film. In practice, the inventor says, the interchange of operations is very rapid, so that the film revolves almost continuously at a little less than one-half the speed of the shaft. Great durability and freedom from sticking and kindred troubles are claimed for this type of bearing.

Auto Information for the Novice—I.

Advantages of the New Form of Private Conveyance Over the Horse Drawn Vehicle—Suggestions for Intending Purchasers.

BY W. P. STEPHENS.

Apart from those fortunate ones who can afford the luxury of a private "garage" filled with all varieties of automobiles, there is to-day a constantly growing number of persons who have under consideration the initial purchase of one machine; and who are concerned with three questions: Will a motor vehicle add to my pleasure or aid me in my business? Can I do with it all that I am now doing with horses and the ordinary carriage? What type shall I buy?

The first two questions may be answered offhand: used for general pleasure riding, for touring or for ordinary business, the motor vehicle as it stands to-day, will not only do all that a horse will, but opens a new and unlimited field. Strong, powerful, knowing no fatigue and subject to no mortal ailments, it will do continuously at a high speed what a horse can do only intermittently at a comparatively low speed. Its capabilities, instead of being permanently confined to narrow limits, are already extensively and constantly increasing as new improvements are being made. The locomotive looked upon in its infancy as merely a good substitute for the horse in hauling coal in the mining districts or shortening the time between two neighboring cities, is recognized to-day as one of the vital factors of modern civilization. The motor car, now rated but little higher in the popular estimation than as another substitute for the horse, in a limited line of work, has before it quite as vast possibilities, as yet only indicated.

The man who contemplates the purchase of a motor vehicle for any well defined purpose of pleasure or business need no longer hesitate until further advances have been made; assuming that he is prepared to exercise such care and skill in its use as is demanded by all classes of machines the only question before him is that of the most desirable type for his special wants. As a starting point in that search for information which will ultimately make him a skilful and enthusiastic motorist, it is proposed to review in a brief way the characteristics of the leading types.

While the term "horseless carriage" was literally applicable to all the early experimental machines, it has long since lost its meaning, and it is well at the outset to ignore it and to accept the modern motor car as something radically different from and capable of a far wider range of utility than any combination of wheels and hoofs. It has so little in common with this time-honored combination that any close mental association of the two can only serve to implant a false idea of its nature, its capabilities, and its care and use. It is in reality a miniature locomotive, with no limitation to fixed tracks, but capable of traversing all varieties of ordinary roads. It is a machine representing in its production almost the acme of human skill; and as such, its successful use demands not the same high intelligence and perfect mechanical training as was necessary for its creation, but a reasonable amount of both care and skill.

That course of evolution which began years ago with the removal of the shafts of an ordinary carriage and the attachment of a small steam engine has resulted in a distinct type of vehicle with certain special features of its own, but approaching the locomotive rather than the horse-drawn carriage. While there are good reasons for adhering to the general form of the latter in the lighter cars, such as the ordinary steam runabout, the whole tendency of modern design is toward the locomotive type, a flat, rectangular platform carried on the front and rear axles and supporting the engine, the water and fuel tanks, and the seats. While the carriage type, with a distinct body suspended by springs on a running gear composed of axles united by light braces (reaches) is suitable for the lighter vehicles carrying but two persons, the locomotive type has its advantages in the faster and heavier cars carrying four or more.

The application of the propelling power from within the vehicle instead of from without, as well as the additional weight of the power, calls for a far stronger construction than in an ordinary carriage of the same passenger capacity; and as the limit of speed is at least double that of the horse-drawn vehicle the shocks of the road are necessarily greater. These altered conditions call for some very important changes from the old carriage and involve the introduction of two entirely new details. The familiar construction of a movable front axle, turning on one central pivot (kingbolt), is inadmissible, as the turning radius is entirely too great and the leverage of the wheels on the steering mechanism would be too powerful for safe steering. The almost universal construction in the motor car is the fixed front axle with forked ends, each carrying the short axle end on which the wheel revolves, this end being pivoted vertically and fitted with a short arm to which the steering rod is connected. With this device the front wheels may be kept under safe control and at the same time each may be quickly turned to a sharp angle with the front axle, giving a very short turning radius.

In the ordinary carriage each of the four wheels is free to revolve independently on its respective end of a "dead" or fixed axle; thus accommodating itself to the irregularities and in particular to the curves of the road. In all self-propelled vehicles the power is applied through the medium of at least one "live" axle, to which the wheels are rigidly attached, or by some equivalent device. It will be evident that while the four wheels will run properly in a straight line, as soon as the course of direction begins to curve, the outer of any two wheels fixed to the same axle will have to traverse a greater distance and consequently to turn faster than the inner one; the result being a twisting strain on the axle. In all vehicles running with flanged wheels on metal rails this difficulty is disposed of in a simple manner; the "tread" or running surface of each wheel is made considerably wider than the rail and in the form of a short section of a cone, with the base inward, a certain amount of play being allowed at the same time between the rails and the flanges. In passing around a curve the centrifugal force tends to throw the vehicle away from the center, the outer wheel travels on the largest radius of the cone and the inner wheel on the smallest radius, thus in a great measure equalizing the different distances which each is compelled to cover in the same time.

This method is, of course, entirely inapplicable to a vehicle with ordinary wheels moving on the flat surface of a road, and in any event it is but a makeshift, involving an amount of slipping which, through negligible in solid steel wheels shrunk on to solid steel axles, would be fatal in the case of wire or wood wheels with pneumatic tires and the ordinary light steel axle of the motor car. That absolutely free and independent action of the driving wheels of a motor vehicle which is an essential of its successful operation is obtained by means of a device called the "differential." This is an ingenious combination of gear wheels inclosed in a circular box which forms a part of the live axle, uniting the two separate halves of the axle to which the wheels are attached. As long as the pressures or resistance of the two wheels are equal, the gears remain quiescent; but as soon as the pressures become unequal, the inner wheel tending to drag as the outer wheel covers more ground in rounding a curve, the gears begin to work, with a tendency to throw one wheel forward and the other backward in proportion to the difference in pressure, thus establishing a perfect equilibrium. These two devices, the fixed front axle with its 'steering

knuckles," and the "differential," both invented by a French engineer in 1827, give the motor vehicle a distinctive place of its own between the horse-drawn carriage and the track locomotive.

The wheels of the motor car are in general principles identical with those of the horseless carriage, but the bicycle and motor vehicle together have of recent years wrought a marvelous revolution in wheel-making, giving us the wire wheel, many improved forms of wood wheel, and the rubber tire, both solid and pneumatic. Looking back to the typical carriage wheel with hickory spokes and felloe and narrow iron tire, it seems almost incredible that these were but a fey years ago accepted as thoroughly satisfactory, no effort being made for their improvement. While these, with the attendant crudity of the plain carriage axle, were possible though uncomfortable and wasteful of power in the slow-moving carriage, the development of the bicycle and later the motor vehicle with the increase of speed on roads still in a primitive condition, has called forth many inventions for the lessening of the discomforts of riding and the economy of propelling power. The pneumatic tire, the wire wheel and the ball-bearing axle, now common to all high-class vehicles, practically owe their origin to the new locomotion..

The spring system of the motor vehicle is merely a development and improvement of that of the old carriage, a greater variety of construction is called for, with a higher quality of material and workmanship to stand the extra weights and more violent shocks, but the advances are in matters of detail rather than principle.

The arrangement and construction of the motor car body is essentially the same as in the old carriage with one important exception; the general design is controlled largely by the necessity of providing suitable places for engine, tanks, batteries, and other parts of the propelling plant. The skill of the coach builder, long ago developed to a very high point, has been called on for new efforts in producing a variety of novel forms of body for the various classes of motor cars and also in giving greater strength and even higher finish. Thus far the development has been very largely in the line of open vehicles, especially in this country; but it is evident from the progress already made abroad and from the increasing adoption of the motor vehicle for every-day use and also for touring that the coming demand will be for vehicles affording adequate protection from the elements.

The driver of a locomotive is of course relieved from all responsibility of direction, his machine follows the rails with no possibility of a change of course. The driver of a horse-drawn vehicle has at least a nominal control over the course by means of reins and bit through which the motive power, unless it wills otherwise, is induced to exert itself on the long lever—shafts or tongue—connected with the movable front axle. The motor car is, with a possible reservation as to "skidding," fully amenable to the will of its driver, who on his part must exercise a complete and vigilant control, while the car is in motion. The general principle of direction, though the pivoted ends of the front axle have already been described, it is only necessary to add that the rod which joins the two "steering knuckles" is connected to a lever or tiller or to a steering wheel in front of the driver. In the lighter classes of cars the lever is preferred, the connection being through a simple rod and hinged joints. In the heavier and speedier cars the wheel is used as giving more power and a better control, the lower end of the inclined steering tube being fitted with a quadrant or worm gear which not only gives great power but locks the wheels so that they cannot be deflected by any obstruction of the road; as is the case with the light lever gear.

The brake which is ordinarily but a superficial adjunct of the horseless carriage has of necessity developed in the motor vehicle to a power and completeness almost approaching that of the locomotive. The brake system demanded by due regard for safety, and fitted to all thoroughly equipped cars, includes a powerful foot-brake applied to some part of the driving machinery and in addition two band-brakes operated by a hand lever and acting on drums attached to the driving wheels. The perfect control assured to the motor vehicle by adequate brakes makes it safer at high speeds than horse-drawn vehicles at comparatively low speeds.

We have seen what the motor vehicle is in a general way, how it resembles, and more particularly how it differs from the horse-drawn carriage; the next question is that of the characteristics of each type as dependent on the power—steam, gas or electricity. These important details will be considered in subsequent articles.

Gordon Bennett Cup Race.

The Automobile Club of America has not yet decided on representation in the Gordon-Bennett cup contest to be held in Ireland in 1903. All American entries must be made through this club, but the organization is waiting now for more complete information from the committee in Paris. A copy of the rules had been sent to New York, but these have since been amended. Until the revised regulations are received, no action will be taken by the club. There are several members who desire to enter the contests, but until they reach a decision in the matter they ask that their names be withheld from the public.

The French Automobile Club has designated two Panhard-Levassor machines and one Mors machine to defend the French colors in the 1903 race for the Bennett International Cup, with alternates of the same manufactures. Protests are already heard from those who contend that it would be better to wait till the last minute before nominating the defending cars, as the Nice races or other events might bring out other machines of greater speed and durability than those mentioned. It is pointed out that the rules of the International cup race demand only that every club which intends to compete shall notify the governing body (in this case the Automobile Club of Great Britain and Ireland) of the number of vehicles which it will run, before January 1, and by registered letter. Each club can be represented by one, two or three vehicles of its own choice, and the machines must be driven by members of the competing clubs.

English Show Exhibits.

The National Association of Automobile Manufacturers has decided against a representative display at the English shows that will be held in 1903. It had been among the plans of the association to send over exhibits for the show to be held at the Agricultural Hall, Islington, London, in March. Recently, a letter was received by Harry Unwin, secretary of the association, in which it was stated that the Society of Motor Manufacturers and Traders, an organization of British automobile makers recently formed, that the English organization had decided to be represented at only one show, the one to be held in the Crystal Palace in January. The members have bound themselves under a penalty of £250 to keep to this agreement.

The American association feared that should it choose the March show in preference to the one patronized by the English society, it might be interpreted as a discourtesy. It is hoped that a representative display may appear in the British exhibitions of 1904. Of course, American machines will be shown at both the Crystal Palace and the Agricultural Hall shows next year, but they will be placed there by the London agents, and will have no official relation to the National Association of Automobile Manufacturers.

New York City Licenses.

The joint committee meeting of the Automobile Club of America and the National Association of Automobile Manufacturers was held in the club rooms Thursday to discuss the question of licenses, now before the New York board of aldermen. Albert R. Shattuck, George F. Chamberlin and W. W. Niles represented the club, and Hart O. Berg, F. M. Lande and S. T. Davis, Jr., the Association. Judge Church, of Brooklyn, was also present. The committee reached no decision on the position that it will take in the matter.

Foreign

POINTS IN MOTOR WORK DISCUSSED IN ENGLAND.

GASOLINE BY ROAD TO INTERIOR.

Water Sprayed in Motors Shows Increased Efficiency—Causes of Pre-Ignition—Constructor of Wolseley Cars Down on Steel and Complicated Castings—Hydroleum Burner Described.

Staff Correspondence.

LONDON, Nov. 4.—The petrol transportation question remains as acute as ever. The railway companies banded together to scotch a new form of locomotion in which they scent a cloud of competition, at present no bigger than a man's hand, have stirred up all the automobile bodies to protest and petition. The small merchants far away from the depots of the two principal oil companies—the Anglo-American, which is the English name for your Standard Oil Company, and Carless, Capel & Leonard—are already making preparations to run their own supplies from these depots by road, and, as the railway freights for inflammables are very heavy, they may, nay, they will find, a saving of something between 50 and 70 per cent. on the cost of carriage, with the result that this traffic will never more return to the iron road.

On the night of October 31 over five hundred members and visitors gathered in the Lecture Hall of the Institution of Mechanical Engineers to continue the but hardly commenced discussion on Captain Longridge's most interesting and painstaking paper. So far as it has gone the discussion has not displayed any very interesting features, save in the reference made by two or three speakers to the spraying of water into the combustion chamber at the moment of or just prior to ignition.

One of the speakers referred to certain experiments he had made with an apparatus temporarily rugged up to introduce water into the compressed charge of vapor and air, and expressed himself astonished at the results obtained. The introduction of a small quantity of water appeared to have a particularly softening effect upon the running of the engine, without any lop, but on the other hand, something of gain in efficiency as demonstrated on the brake. Moreover the water in the water jacket did not heat up nearly so rapidly as when the water spray was not used. Indeed after running the engine at 800 revolutions for 10 minutes, the operator was able to bear his hand upon the combustion chamber without acute discomfort which he could not possibly do after running the engine for a similar period without the spray.

LUBRICANTS NOT TO BLAME.

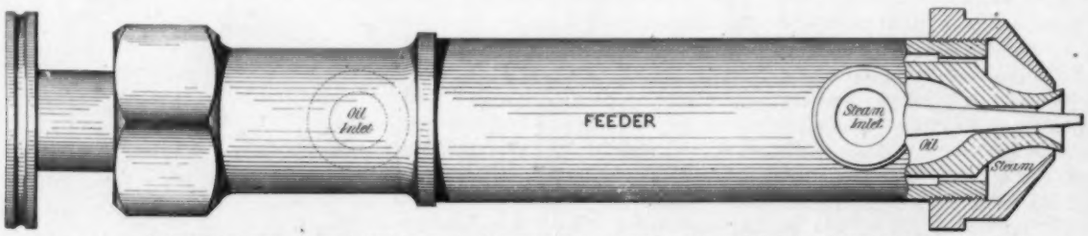
Some reference was made in Captain Longridge's paper to premature ignition and its prevention, the gallant gentleman being somewhat prone to ascribe such undesirable occurrences to lubrication with low flash oils. The speaker just referred to gave examples of sundry tests he had made in this direction, the results of which did not appear to bear out Captain Longridge's suggestions. He had filled the crank chamber of his engine with a very low flash lubricating oil till his crank shaft was awash, he had introduced no less than 2 ounces of the same lubricant above the piston of one of his cylinders (he was experimenting with a 2-cylinder 6 horse power Daimler engine bolted to a bedplate), and did not get and pre-ignitions. He then drained his water jacket and ran the engine until she was very hot, but still copiously lubricated and still did not obtain pre-ignitions. Examination of the cylinder showed that the lubricant did flash, but that it must do so at the same moment as, or after the ignition of the explosive charge, so that by the light of his tests he was unable to agree with Captain Longridge in this matter. In his opinion there were two causes of premature ignition: (a) the incandescence of the platinum sparking points, and (b) the bad constructional form of combustion chambers.

Mr. Austen, the designer and constructor of the Wolseley cars, naturally agreed with the author of the paper so far as the position of the engine in motor cars went, as the engines of the Wolseley cars are all placed in a horizontal position. As the outcome of great experience, and the construction of one of the most successful petrol cars in this country, Mr. Austen's remarks on the practice followed at the Adderley Works is worth a *précis*. Mr. Austen is of opinion that the engines may be given a rest for a time, and that what motor car engineers should now particularly consider is transmission. Therein was open a great field for improvement.

CASTINGS THAT WARP.

He could not indorse the suggestion to employ mild steel for cylinders. He had always been taught and had found by practice that the best results were obtained from the use of metal containing plenty of carbon and carefully selected cast iron gave much better surfaces than could any form of mild steel. He did not in any way favor solid-headed cylinders, for although they might be ground out perfectly true when cold, that was no sort of warranty that they would retain their true cylindrical form when hot. Indeed with large projecting cavities on one of both sides for valve chambers, no one could say what shape they would assume when they became heated to such temperatures as those to which the combustion chambers of explosion engines were subject.

With regard to cooling systems, it was Mr. Austen's opinion that the engine should be the lowest feature of the system, viz., set below the lowest point of both radiators and tank and pump connections as then there was always a certainty of having the water-jacket full and if the pump failed, the thermal action would still provide a certain amount of cooling and avoid seizing.



"HYDROLEUM" BURNER, NOW ATTRACTING MUCH ATTENTION IN ENGLAND.

TEXAS OIL FOR STEAM CARS.

I have already spoken of the extreme interest now being evinced in the Hydroleum burner with regard to its adaptation to steam cars. The sketch given hereunder shows clearly the form of this burner, with which Texas oil, that can be bought here at 2 pence per gallon in lieu of gasoline at 14 pence, can be employed. It is only necessary to raise steam to a pressure of 5 pounds to the square inch to start the burner and this is done by means of an auxiliary burner, using methylated spirit. The fierceness of the fire is then entirely under the control of the steam jet, which induces a flow of the heavy oil from a float feed chamber exactly in proportion to the velocity of the steam jet. The mingled steam and atomized oil impinge on a dash brick suitably placed and there igniting, form a mass of flame in a fire pan placed beneath the boiler in the situation occupied by the gasoline burner as at present used. I have seen steam raised in a boiler with this system from cold to 200 pounds per square

inch in 12 minutes, and it is stated that the steam and fuel have been cut off and re-ignited by the heat of the system after standing two hours. The future of this fitting, as applied to light cars, is being watched with the greatest interest.

HUNDREDS OF CARS IN LINE.

Emancipation Day, viz., the anniversary of the passing of the Bill in 1896, by which automobiles were permitted to run on the public roads of this country, is to be celebrated by a great meet of automobiles under the auspices of the Automobile Club, on next Saturday, November 8. The cars will run down the old Bath road as far as Reading, and thence to Oxford. The start will be made from Hyde Park corner as in the famous 1,000 miles progress three years ago, and the run will be continued after lunch at the Berkshire Capital to Oxford. The run is open to the world, and non-stop certificates will be awarded by the club. The cars are to be identified by fancy names. The distance from London to Oxford, via Reading and the Valley of the Thames, is about 72 miles. It is contemplated that from 300 to 400 vehicles may participate in the run.

Foreign Notes of Interest.

Thrupp & Maberly, an old carriage building firm of London, say that their large business on the old lines is now quite eclipsed by orders for automobile bodies.

Mr. Buchet, inventor and manufacturer of the high-speed motor used on racing motor cycles and for dirigible balloons, died from blood poisoning in Paris, October 29. In his motors piston speed was reduced by shortening the stroke.

In Nottinghamshire, England, 348 heavy steam automobiles transport goods over the highways, according to the report of the county surveyor. Of these 18 are licensed to run all the time, 164 run in and out of the county under special permits for certain days, and 167 are used for agricultural purposes and require no license. The great development of steam wagons for heavy traffic in this district is due mainly to the efforts of E. Shrapnel Smith, honorary secretary of the Self-propelled Traffic Association of Liverpool.

Alexandre Ular has discovered, in an article published by *L'Auto Vélo*, of Paris, that the Chinese had mechanical vehicles sixteen hundred years ago and used them extensively. In Northern Mongolia he found two huge locomotives employed in drawing gold ore over the highways. The wheels of these machines are 7 1-2 feet in diameter. Mr. Ular proposes to make the trip from Pekin to Paris with a machine of a type similar to these locomotives, which the reader is made to infer are relics of the antique automobilism of the Celestial Empire.

Expert Discussion of the Oil-Engine Automobiles of 1902*—II.

BY CAPT. C. C. LONGRIDGE.

In material and methods of manufacture, there is plenty of room for improvement. With very rare exceptions the present car motors have cast iron, solid-head, water-jacketed cylinders, cast complete with valve-box in one piece. It is scarcely possible to imagine a design better adapted to give trouble in the foundry or the workshop; or one less in accordance with metallurgical requirements. A casting of this description, intricate in shape, full of angles, curves, bosses, ribs, varying thicknesses, etc., enormously increases the difficulties of moulding and producing sound castings. The number of wasters that must and do occur in the foundry, in the machine and testing shops, is quite a serious matter. Apart from this commercial objection, a casting of this design is ill-suited to its purpose. First, because the variations of thickness and the ribs between the walls produce irregular expansion and contraction. Secondly, because it almost precludes the possibility of using the best iron for the purpose, the founder naturally working with a very fluid running mixture.

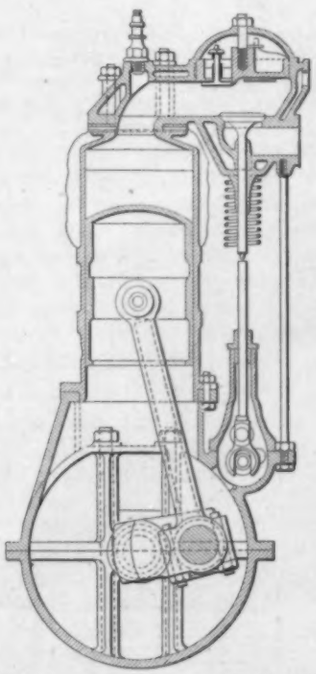


FIG. 1—TRANSVERSE SECTION OF NEW PANHARD AND LEVASSOR MOTOR.

The wall of each separate cylinder is of thin wrought steel; the cylinder head is an elbow tube, cast with water-jacket, and contains inlet and exhaust valves, also ignition tube. The cylinder and head are united by a strapped joint and by studs and nuts. The water-jacket is of corrugated copper soldered to the cylinder.

While the majority of makers have been caught by the "drawing-office" solid-head, water-jacketed design, a few more practical makers, such as Panhard, Mors, Napier, have followed the plan of casting the cylinders separate, and adding a light aluminum, or rolled metal, water-jacket. This method admits of a simpler casting, for which the best metal can be used.

On the question of what is the best metal, there is a difference of opinion. Professor Hiorns inclines to white hematite, cast in metal moulds. Theoretically this is no doubt correct, but commercially the limited output and the constant changes of design might not justify the cost of moulds, and the expense of grinding the cylinders. For these reasons, both Professor Hiorns and Professor Turner recommend, as an alternative, the use of the closest and hardest iron that can be conveniently machined.

The casting of a cylinder, where there is any intricacy of design, should be a matter for special precautions. While it is not practicable to employ a system of fluid compression, such as the Whitworth or the more recent French Harmet system (*tréfilage*), some equivalent should be sought by insisting on adequate head. Colonel Holden's opinion is that for intricate cylinder castings a head of 200 per

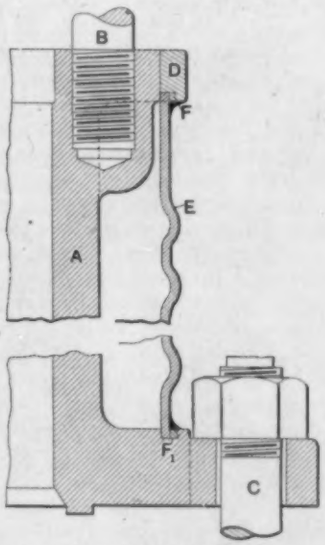


FIG. 2—METHOD OF ATTACHING A LIGHT WATER-JACKET.

A the cylinder; B C studs securing cylinder head and frame; D iron or steel ring forced over the cylinder head and grooved to receive the jacket; E steel metal jacket; F F copper wire caulked into groove, black surfaces represent solder if added.

*From a paper read before the Institution of Mechanical Engineers in London, England.

cent. by weight, that is double the weight of the casting, should be specified by manufacturers. The author has had sufficient practical experience in foundry management to concur in the value of ample head, if present designs are followed.

STEEL FOR ENGINE CYLINDERS.

In view, however, of the troubles arising from porous cylinders and for other reasons, the author favors the substitution of steel tubes for cast-iron cylinders. Lightness, strength, freedom from flaws, easy cooling, and probably, on the whole, cheapness, are much in favor of this material for small motor cylinders. Steel tubes screwed into a cast-steel or cast-iron head should make a good job. If the output warranted the initial cost in dies, pressed steel heads could be made. But the steel cylinder itself would involve no great expense; some years ago, the author saw a small German motor with steel-tube cylinders, in which no running troubles were experienced. Another instance, probably known to all here, is the Holden cycle motor. The class of steel used by Colonel Holden contains 0.35 per cent. carbon, and no trouble has occurred. Brandon & Perkins, for their Victoria motor bicycle, bore the cylinders from the solid bar steel, turning the radiating fins in the lathe. Panhard and Levassor in their Paris-Vienna type racer, run in the last French alcohol trials, are said to have used cast-steel cylinders, with a copper water-jacket. In their new "Centaure" motor, Fig. 1, in the 40 horse power racer of Charron, Girardot et Voigt, and in the Cannstatt Daimler racing cars, steel is the material used; and, under the severe conditions of racing, no running difficulties have been recorded. There is really no reason why steel should not successfully and advantageously replace cast iron. In a communication recently addressed to the author, Professor Turner wrote: "My impression is that solid drawn steel tubes would be best. They would be stronger, weight for weight, and more trustworthy." This has always been the author's opinion.

In any case, he is certain that the method of casting cylinder and jacket together is wrong; and that if the cylinder is of cast iron, it should be cast alone, and a light jacket added, as shown in Fig. 2. It is difficult to feel the pulse of a trade, except through its leading organ. But, judged by that standard, the view held by the author is gaining ground. In an editorial on "Detail Improvements," June 14, 1902, *The Autocar* states: "It will be remembered that, when the aluminum jacket was first fitted to the cylinder liner, critics prophesied disaster for the Napier, as they said it was wrong to combine two metals in this way. At the same time, we feel safe in prophesying that the cylinder of the future will be built in this manner. That is to say, there will be a central liner, possibly of weldless steel, while the water-jacket will be of the lightest construction."

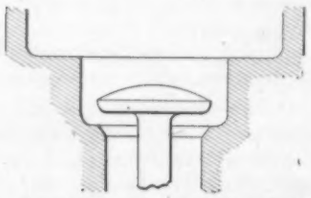


FIG. 3 — METHOD OF COUNTERSINKING VALVES TO GIVE DIRECT FLOW.

In using steel cylinders, cast-iron piston rings might be retained. For these, a strong, fine-grained, elastic iron would be the best.

Greater elasticity and resistance to external pressure is obtained by casting from pots in a chill mould.

ENGINE DETAILS—THE VALVES.

These are the lungs of the machine and vital to its action. The usual practice is an automatic spring induction valve, opened by the suction of cylinder; and a mechanically lifted, but spring-closed, exhaust valve, commonly cam-driven by a half-speed shaft. The combination is exceedingly crude, and a few manufacturers are now waking up to the advantages of mechanical operation for both valves. At the last Chicago Automobile Show, four motors, all of different makers, had mechanically operated valves. The leading German firm, the Cannstatt Daimler Motor Co., has adopted this practice in its new Mercedes Simplex. In France, for instance, Peugeot in his new 8 horse power car, and in England, G. F. Milnes & Co., have followed suit; and there can be little doubt that other makers will be forced into line. There is, of course, nothing new in mechanically operated valves for explosion engines. Quite a number of patents for valve actuation by magnetic attraction, compressed air, exhaust pressure, &c., &c., have been registered in past years, but so far few automotor makers have recognized the advantages of the system.

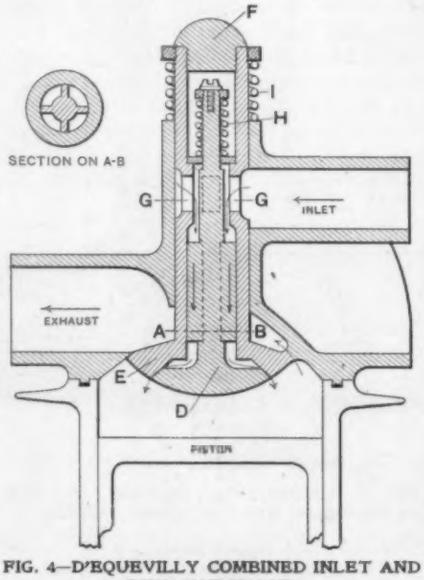


FIG. 4—D'EQUEVILLY COMBINED INLET AND EXHAUST VALVE.

The exhaust valve E is recessed to receive the inlet valve D. F the cap of the exhaust valve spindle, is actuated by a two-to-one shaft and rod, not shown. I is the exhaust valve spring; H a weaker spring for the inlet. The shock of the exhaust spring valve closing, bounces the inlet valve at the same moment. The inlet valve stem is fluted, as shown in section across A B, forming channels for the charge to the head of the valve.

There are several reasons why with high-speed motors mechanical operation of the valves should be adopted. Owing partly to clearance and partly to back pressure from the silencer, the cylinder at the end of the exhaust stroke is filled with burnt gases above atmospheric pressure. When the piston, therefore, begins the induction stroke, these have to expand before air can be drawn in by suction; hence one of the disadvantages of the automatic inlet valve is that it is sluggish in opening. This is just the reverse of what should be. For in high-speed motors the valve should not only open promptly at the very beginning of the stroke, but might preferably be given a "lead," thereby promoting scavenging of the combustion chamber. Again, the automatic valve closes at the end of the suction stroke, whereas it might be better to keep the inlet valve open a trifle after the piston had begun the compression stroke, that is, before the slight vacuum in the cylinder has been converted by the piston into compression above atmosphere. By so doing, the momentum of the air in the inlet pipe tends to add to the volume of the charge.

It may be noticed that where governing by volume throttling is used, if the spring of the exhaust valve weakens, the increased suction of the piston on the intake stroke may cause exhaust gases to be drawn back through the valve into the cylinder, with the risk of a miss or a slow firing through the presence of exhaust gas round the sparking plug, or of premature ignition, if the gas is hot. The advantages of mechan-

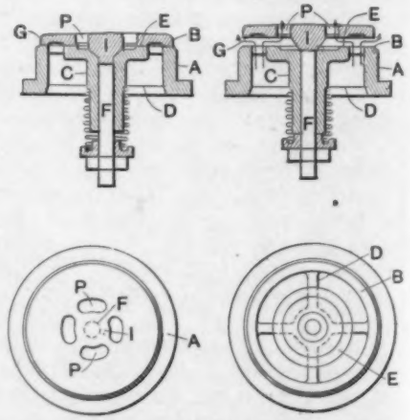


FIG. 5—NAPIER ANNULAR INLET VALVE.

A Cylindrical valve seat; B E two annular flat face rings; D connecting radial webs. The ring E is formed in a sleeve C, forming bearing for valve spindle F. When the valve opens, the gas passes through the annular space between the seatings B E, and also throught the space P, between the head I, and the ring G, GE.

ical valves, therefore, are sure and proper action, which the trade is now beginning to appreciate.

MATERIAL FOR VALVES.

As regards the material for valves, their seating and fitting, there is again difference of opinion. There can be no question that the spindle and head are best made of different material. For the head the author favors nickel-steel; cast-iron wears well, but for large valves it seems hardly strong enough. A weak point in one-piece valves is the neck, and in this respect the exhaust valve and stem designed by W. Norris in 1892 is praiseworthy. Moreover, it facilitates repairs and the method of lift throws very little cross strain and irregular wear on the spindle. Where trouble has arisen, and there has been plenty of it, with burning, irregular wear, and breakage of valves, it has usually been ascribed to weakness in the neck, unsuitable material, faulty methods of lift, throttling of the exhaust by insufficient area of the valve, exhaust pipe, or silencer. Any deficiency here may lead to broken valves. With a choked exhaust, the pressure left in the cylinder combined with the spring may produce hammering of the valve on its seat. In time this leads to brittleness and fracture. There is, however, another cause of a very different nature which the author suggests as a probable source of much of the irregular wear and ultimate fracture of valves.

A DEFECT IN DESIGN.

Those conversant with the construction of horizontal plunger pumps will recognize a defect frequently found in otherwise well-designed machines. This is the placing of the valve seat on a level with the waterway. The effect of such an arrangement is that not only is the discharge greater on one side than on the other, but the water, diverted into a new direction, while in the act of passing the valve, exerts a tilting force on it, pressing the valve towards the waterway. The results are irregular wear, sticking, and hammering of the valve on its seat.

Now the usual disposition in the vertical motor is similar—a horizontal port with a vertical exhaust valve, the latter seated on a level with the former. An analogous state of affairs is thus established, a flow of gas, in lieu of water, being diverted into a new direction while passing the valve. There is, therefore, the same unequal discharge, with the similar tilting action and tendency to force the valve from its true position.

But there is this difference: in the pump the stroke is comparatively slow, the flow tardy, the pressure low, the valve, spindle, seat and guides cold, and in the best condition to resist wear; whereas in the motor the valve beat is extremely rapid, the gas-flow swift, the pressure high, and all surfaces so highly heated as to be in the worst condition to withstand attrition and deformation. Thus the evils of bad design in the pump are much aggravated in the case of the motor, the tilting action being greater and the irregular burning and side wear more rapid.

The remedy in both cases is the same. The valve seats should be kept respectively below the waterway or the gas passage so as to permit the flow of water in the one case to rise upward until clear of the valve before taking a new direction, or the rush of gas in the other case to acquire a straight downward course before reaching the valve, Fig. 3. All tilting action is thus eliminated. Naturally the usual precaution of fully equal area in the annular space round the valve to that of the valve outlet must be preserved.

Far the better practice would be to avoid port passages and place the inlet and the outlet valves on the head of the combustion chamber. With the heavier oils this position has the additional advantage of direct charge admission without a possible condensation by contact with the port and cylinder walls. Naturally it slightly increases the height of the motor. Examples of valves so placed are the Buchet motors, the 3-cylinder 20 horse power Maudslay motor, and the Belsize cars of Marshall & Co.

VALVE AREA DISCUSSED.

In this year's motors, there is among the best makers a marked and very praiseworthy tendency towards increased valve area. Where the sluggish-acting automatic inlet valve is retained, the difficulty with high piston-speed of ensuring a full charge is increased; and, in such cases, if 80 feet per second for induction and 100 feet per second for exhaust are to be at all approximated, it is evident that the valve areas can scarcely be too ample. There is little doubt that the sharp blast considered necessary in the aspiration method of carburation to secure proper suction and mixing of the petrol has hitherto militated against the use of large-sized inlet pipe and valves. The necessity for this sharp blast is purely imaginary, as there are many very obvious ways in which the difficulties, real or apparent, are easily overcome.

The tendency to enlarge valve areas became noticeable about the time of the late Paris Exhibition, and as further instance of its development may be mentioned the Napier so-called pyramidal or annular valve, Fig. 5. This valve claims, with the same lift, to give 50 per cent. larger passage than the ordinary mushroom type of the same diameter. The new Centaur motor of Panhard and Levassor adopts a very similar triple-induction valve. So far as the author is aware, no clear rules for determining the valve areas of explosion engines have been published. There is no difficulty in calculating the induction-valve area, but the problem of the exhaust valve is less simple. In any case the common practice of making inlet and outlet valve of equal area cannot be right. In *The Engineer*, London, July 20, 1900, J. J. Roots gave certain formulæ for calculating valve areas.

These are the only formulæ the author remembers having seen, but they appear to be incomplete because they do not state what are the resulting velocities of the gas flow, and defective because they apparently assume discharge at equal pressure in all cases.

In all the better classes of motors, this is now well provided for. In the Daimler, the removal of one nut enables the bridge to be removed and the valves inspected. Similar devices are now found on most cars.

APPLICANTS FOR SPACE AT THE MADISON SQUARE SHOW.

Applicants continue to swamp the offices of the managers of the New York Automobile Show to be held in Madison Square Garden January 17 to 24 next, with their demands for space. But the allotments have all been made and, with the exception of a probable alteration or two in the schedule, the chart will stand as it is now arranged. Every inch of space on the arena floor that may be spared for exhibition purposes has been leased. The restaurant is to be stripped to make room for the display. Even the cellar and the tunnel will contain the exhibitions of some of the larger manufacturers who failed to get space on the arena floor. One maker who has secured room enough in the cellar to permit him to squeeze in two carriages, has been arranging for space in the arena. There are seven automobile manufacturers who are waiting to take up this space in the cellar when it is vacated. All that the managers have of tact and diplomacy has been called into activity to make the allotments so as to offend the least number of applicants. Yet even they, feeling as they must, that they have done the best that lies within their power, realize that there will be complaints.

One man called at the office of Mr. Young a few days ago and asked what desirable space on the arena floor could be offered him. And this, though the lists were closed September 22.

An attempt at an estimate of the probable attendance at the show has been made. Taking into consideration the increase in the interest in automobiling and at the attendance at the last show, which was 20,000, the prophets decline to make their figures under 40,000. It is not improbable that 50,000 persons will visit the Garden during the exhibition.

The entertainment committee formed by the National Association of Automobile Manufacturers at a meeting held November 12, decided on a banquet to be given on Wednesday night, January 21. The details have not yet been arranged.

In order to avoid accidents, the managers have decided that no vehicles with gasoline in their containers will be permitted to enter the Garden.

Digest of the U. S. Consular Reports on Prospects for Export Trade—I.

Little Bits of Knowledge on Foreign Automobile Conditions Bearing on the Ability of American Manufacturers to Sell Their Products Abroad—Tariff Duties.

If the inquiries in regard to foreign automobile trade which have reached the Department of State in Washington and which have now been answered in a large number of Consular Reports, were prompted by a desire, on the part of the inquiring manufacturers, to find a relief market—or, less euphoniously, a dumping ground—for those American automobiles which cannot be sold at home, the answers cannot be considered encouraging. Our consuls abroad do not report that Europeans, Africanders, Asiatics or Australians stand with well-filled purses ready and eager for a liberal disbursement on sight of an American, or any other, automobile that may be landed on their shores.

Even the more conservative view which sees in foreign trade mainly a safety vent permitting rapid production by high-pressure manufacturing methods, is not strongly countenanced by the consuls. Only the wealthiest countries seem to be ready for automobilism. Only those in which machine shops are numerous and capable mechanics plentiful seem to be adapted to accept the gospel of machine traction at present.

MANUFACTURING FACILITIES FOR U. S.

But in the picture of difficulties to be overcome by the American exporter of automobiles, there is one bright ray of light illuminating the prospects of the future: No other country can compare with the United States in the elasticity of facilities for production. France and Belgium alone produce more vehicles than they can sell at home, and in France the two most celebrated manufacturing firms have sold their product for 1903 in advance and have large orders ahead for 1904. They are manifestly incapable of expanding their facilities without detriment to the workmanship upon which their reputation has been built.

England cannot yet supply her own home demand, but imports largely from France, Belgium and the United States.

In Germany the home demand was sluggish for a long time, but since the Paris-Berlin race has increased very rapidly. Only one firm, the Cannstatt-Daimler Company, sells extensively to foreign countries and obtains high prices. Most other firms operate under license by French patentees and will find it difficult to compete with the original French designs outside the boundaries of Germany.

In manufacturing methods Germany, however, stands closer to the United States than either France or England, and in methods for stimulating export trade it is in the lead. In that peculiar combination of engineering talent, artistic inspiration and bold enterprise which produces the quickest and most remarkable results in the automobile industry, Germany has so far been lagging.

Originality in automobile construction, coupled with industrial enterprise, seems to be possessed in a higher degree in France and in this country than elsewhere —always with due allowance for the Mercedes type developed in Wuertemberg.

Our steam cars, electric runabouts and such types of gasoline vehicles as the Duryea, the Haynes-Apperson, the Oldsmobile, constitute distinctly American contributions to automobile design; and others are under way. They represent the democracy of the automobile movement as distinctly as the Panhard, the Mors and the Mercedes represent its aristocracy and its sport, and the Renault, the Peugeot, the Delahaye and the Georges Richard, the *bourgeoisie*.

CHANCES FOR EXPORT TRADE.

On the vitality and merit of these types and the ability of our industry for rapid production of these and other types, the chances for American automobile export trade seem mainly to depend at the present stage of the industry. As to the future none may tell either where the most suitable types of automobiles will be originated nor in what countries they can be sold.

Among the data given by the consuls customs duties, wealth of population, character of streets and roads, condition of home industry, prices now paid and racial traits are the principal ones bearing on the subject. What they write on these points is summarized in the following:

ENGLAND "DUTY FREE."

In England there are no customs duties. The demand is constantly increasing and the British industry cannot supply it. Light steam cars are favorably considered. No restrictions upon design or construction are communicated, but exist nevertheless, forming part of the traffic regulations, and relate especially to efficient brakes and invisibility of steam exhaust.

DUTIES IN GERMANY.

Germany has a duty of $1.90 per 100 kilograms (220 pounds). Heavier duties are proposed, but even if sanctioned will not go in force until 1904, and will not be onerous except for motor cycles. The consul mentions the difficulty of repairing foreign-built cars, but it seems that this obstacle should be less pronounced in Germany than almost anywhere else. A rapidly increasing use of automobiles, sprung up almost entirely during the past twelvemonth, is noted.

Police authorities in Berlin require two independent brakes on every vehicle, each of them capable of stopping it within a distance of 26 feet, when going at a speed of 9.32 miles per hour. Cars must be able to turn around in a street 32 feet in width. Excessive noise, smoke, steam or odors are prohibited. From Saxony antiquated restrictions upon the construction of boilers for steam vehicles are reported.

AUTOMOBILES IN AUSTRIA.

The duty on complete automobiles imported into Austria is $36.49 for each vehicle, besides $7.31 per 220 pounds weight of motor and metal gears. For the latter a declaration will ordinarily be accepted as sufficient. The duty on motor cycles is $12.18 plus the duty per weight. The people at large have small purchasing ability. The total number in use is about 1,000, mostly of French manufacture, with which the home industry cannot compete except in a few special models of electric vehicles. The field for motor bicycles is considered promising. All automobiles are subject to inspection and approval by a commission of experts before they can be used in Vienna.

The approval can be obtained for a type of vehicle, however, whereafter others of the same construction will be readily admitted. The approbation may be withdrawn for any reason that seems satisfactory to the authorities. For the purpose of facilitating inspection a technical description in duplicate must be furnished with each vehicle (or type of vehicle). Brakes must be double, one set operating directly on driving wheels (except in motor bicycles) and either of them capable of sliding the wheels; one of them must be foot operated. There must also be a sprag or ratchet device to prevent rolling backward on hills. Fuel tanks of gasoline vehicles must be closed "hermetically" and "totally isolated from the heat of the motor," as well as protected against the rays of the sun. The cars must be able to describe a circle with a radius of 6 meters (19 feet). Freight automobiles must be equipped with wheel fellies 4 or 6 inches wide, according to the weight. Those weighing over 8 tons, wagon and load, are, as a rule, not permitted on the public streets or roads.

FRENCH MODELS IN BELGIUM.

Manufacturers in Belgium work mostly under French licenses. Their output is sold in advance. Many cars are imported from France. Gasoline cars of 6 to 12 horse power sell for $1,000 to $3,000 each. Wire wheels are tabooed. The consul sees a good market for light steam cars, with interchangeable repair parts readily ob-

tainable. Pavements are rough on light vehicles, but heavier than 2,000 pounds are frowned upon. The duties are 12 per cent. on invoice value, the latter subject to proof. Traffic regulations require registration and numbering, but no restrictions upon construction are reported.

LOW PRICES IN HOLLAND.

In Holland the duties are 5 per cent. *ad valorem*. No permits to operate are granted until each machine has been inspected by government officer. This can be done under customs house seal, however. Dutchmen will not, as a rule, pay more than $800 for a car. The market for motor bicycles is considered good. Government regulations demand a brake which will stop the car in 33 feet. Highest speed permitted is 12.4 miles per hour; in built-up communities this is reduced to 4.9 miles per hour. In Rotterdam the brake must stop vehicle in 16 1-2 feet. The license system prevails, including a government license and, in some instances, also a permit from the authorities in the province where it is desired to operate the vehicle.

DANISH DUTIES TEN PER CENT.

Denmark imposes a tariff of 10 per cent. on invoice value and freight charges. The country is rich, but the wealth is greatly diffused. At two expositions in 1902, 85 imported cars were sold. The total number in commission reaches about 250. The free port of Copenhagen affords convenient storage for consignments intended for the Scandinavian countries and ports on the Baltic Sea. The roads are similar to those of England, possibly better.

SLIGHT DEMAND IN SWEDEN.

The distances between towns in Sweden would be favorable to automobilism were the country richer. Very few machines are in use. There is one manufacturer of automobiles at Eskilstuna. Customs duties are 15 per cent.

Switzerland levies $40 per ton of automobiles and $140 per ton of motor bicycles. The roads are good, but mountainous, as most people know; the restrictions on traffic are onerous. The purchasing capacity is limited.

Our consul at Athens, Greece, reports 10 per cent. customs duties, no demand for automobiles and none probable.

Italy's development has been slow. She has no independent industry, except that several manufacturers make bodies and gears and assemble automobiles with motors imported from France. Roads are good, bad and indifferent. The market, which promises fairly well among the upper classes, is open to cultivation by Germany and the United States on at least an equal footing with France. Business can be opened only by actual demonstration of the automobiles. Some American steam cars have been sold.

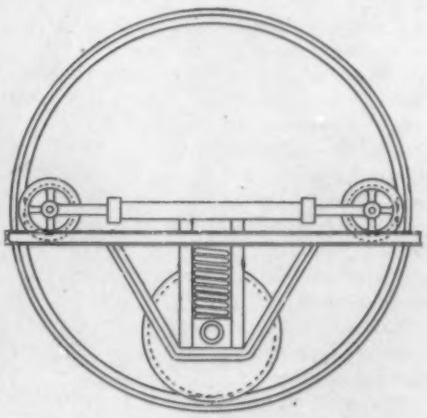
Spain is a country with a "favored nation clause" in the tariff laws. The embargo ranges from $78.40 to $250 per vehicle, being arranged on a weight scale. An additional annual tax amounts to about $20. Four local manufacturers assemble machines of 6 to 8 horse power and obtain from $714 to $928 for each car. Most of the agents of good business standing do business for French manufacturers.

ONE FACTORY IN RUSSIA.

The Czar of Russia gets from $9.27 to $101.97 in import duties on each automobile, according to its size, and the consul states that there is only one native manufacturer. The market for heavy freight automobiles for hauling produce from large estates is known to be promising.

RECRUDESCENCE OF THE VEHICLE LAYING ITS OWN TRACKS.

There is balm for the wounded feelings of the many "unscientific" inventors who have devised schemes for having motor vehicles "lay their own track in front of them as they go," but who have always had their trouble for their pains and have been laughed at besides. The world would not accept this ever-recurring idea seriously but stamped it as a vagary of the misinformed, and truth compels the admission that the schemes were usually fanciful and unproportioned, and that their authors claimed a wider usefulness for their contrivances than common sense would grant them.



RAIL RING TRACTOR WHEEL.

Now, however, comes news from Germany and England that a construction of this character has emerged with flying colors from severe tests imposed by military authorities and has been proved better able to travel over bad roads and

[Illustration from *Der Motorwagen.*]

KELLER'S RAIL RING TRACTOR DRAWING TRAIN OF WAGONS IN GERMANY.

roadless country than any other heavy mechanical vehicle previously tried.

VEHICLE IS DESCRIBED.

The vehicle in question is known as the Keller Road Rail Ring Tractor and was invented by a Mr. Keller in Germany several years ago. After the close of the South African war C. T. Crowden, of the Leamington Motor Works, in England, who had discovered the machine while traveling in the Fatherland, induced the British War Office to send a representative to Germany together with Mr. Crowden to make experiments. The report was again favorable and a five-ton machine was brought to England for inspection and trial at Aldershot, where it was placed in the hands of the committee on mechanical transport and tested for five consecutive days.

Thereafter, *The Autocar* states, a syndicate was formed to acquire the patents for the construction.

The main principle of this construction resides in the use of small driving wheels exerting the traction power on a rail on the inner surface of a broad iron hoop 6 feet 6 inches in diameter. The driving wheels climb the inside of the hoops as a squirrel in a treadmill, and the hoops are thereby made to go around over the ground. Steering is effected by twisting the hoops in the desired direction—the play between the flanged driving wheels and the inner rails of the hoops permitting this motion—and the driving wheels are compelled to follow, as the front portion of the tractor is pivoted to the rear portion. When making a turn the front portion and the front wheels thus stand at an angle with the rear portion and the rear wheels until the steering action ceases. The twisting motion takes effect on each hoop by means of two 10-inch flanged pulleys, which impinge on the hoop rail at diametrically opposite points. They are connected by a frame which incloses a strong helical spring that keeps the pulleys in contact with the rail and also acts as a buffer when obstacles are encountered. The frame is pivoted at the center so that it may be twisted by the steering gear.

ALL WHEELS DRIVE.

The front and rear wheels of the vehicle are identical in design and all of them are driven. The tractor is provided with two sets of engines and both are connected to the driving gear by friction clutches. Both driving wheel axles are driven by chains. Compensation for the pivoting action between the front and rear halves of the vehicle is provided in a manner which is kept secret and the gear which serves this purpose is inclosed in a box which admits of no casual inspection.

Experiments with tarring of the macadamized roads are to be made in the southeastern portion of France.

Auto Trip from New York to Boston.

Special Correspondence.

BOSTON, NOV. 16.—When Harold H. Brown was in New York, at the conclusion of the A. C. A. reliability run, he decided to drive his prize-winning Darracq, B 21, which won the Hill cup in that contest, back to Boston over the road. He undertook the shore road by way of New London and Westerley, and got through, but since his arrival in Boston, he has had some good stories to tell of his experiences on the journey, and the run was difficult enough so that he learned a few new things about the automobile en route.

Mr. Brown summarized his experiences in a talk with your correspondent at the Boston Athletic Club a few evenings ago. He says he came through to Westerley, R. I., without incident, and finding that village rather dull, left his machine there and went on to Providence by train for the night. Mr. Brown has a number of theatrical friends who happened to be playing in Providence that evening, and in a little party after the theater a wager was made that one of the young ladies of the company, Miss Idylla Vyner, would not go to Westerley and assist in bringing over the auto before the afternoon performance of the next day. Miss Vyner was game, and, escorted by two others of the party, hurried back to Westerley by the 1 a. m. train and at 3 o'clock that morning all four were in the Darracq on their way to Providence.

Fifteen miles of rather sandy roads were traversed in good time; then trouble came. Mr. Brown believed at first that the difficulty was with the ignition in the second cylinder, but eventually studied it out that the carbureter had clogged. This he found, made the gasoline flow slowly into the float chamber, so that although the first cylinder got enough for a charge the second cylinder, coming close after it, was deprived of its proper amount of fluid. Then, as there was almost three-fourths of a revolution before the ignition of the first cylinder again, the gasoline had time enough to flow in sufficient quantity for a charge. Three hours' work was required before the machine could be induced to run properly, and meanwhile Miss Vyner made a reputation for patience that would be hard to equal. She took the extra automobile coats that were aboard, laid down on them beside the road, and slept peacefully through the long wait, while the men of the party were working over the machine.

This was not the only time the machine stopped that night. After traveling some miles further, the engine heated up so rapidly that at several of the hills the whole party got out and pushed the machine up by hand. It was found that the water tank, replenished from a roadside ditch, was full of muddy water, which clogged in the strainer and stopped the circulation. The result was that Mr. Brown found himself constrained to fill the tank at every opportunity so that it would overflow to the cylinders, and run the machine until it boiled away to a low level. It was a slow method; and the long and short of it was that Mr. Brown and his party went ambling into Providence that afternoon at 1 o'clock, just in time for the afternoon performance at the theater. The sixty-mile run had taken ten hours.

One might have thought that even an actress would have had enough of the automobile for the time being. But this particular enthusiast asked permission to make the trip to Boston in the Darracq. The only time available was after the evening performance, so on the second night following the Westerley experience, Miss Vyner, accompanied by Miss Ida La Pearl and Mr. Brown, started out of Providence for this city. They exchanged greetings with the police of every town on the route, but this time the automobile carried them through without trouble.

Passing through Norwood one of the town watch stepped out and advised them to run slowly and quietly through Dedham, the next town beyond, as the Dedham police were "apt to be ugly" if aroused from their slumbers at an untimely hour. Outside Dedham the party, which had been subsisting on cakes of sweet chocolate, held up a passing milkman, and at 5:45 a. m. the party teuf-teufed into Boston.

Mr. Brown met a photographer friend at Milton the next day who wanted to take his picture, and the result was a good portrait as well as a first-rate view of the Hill cup-winning machine. The smaller pictures show the party stopping at Kingston, R. I., for gasoline on the forenoon of the Westerley-Providence run; and the old ferry at the mouth of the Connecticut River, where Mr. Brown was obliged to put his auto across on a quaint old steam scow.

A Legal Novelty.

Legal proceedings against automobilists have been so much a part of the daily press reports that a case wherein the owner of a machine demands damages is something of a novelty. It is reported that Theodore Havemeyer is about to bring suit against Charles Hart, a Brooklyn contractor, for negligence in failing to properly mark an excavation in Hoffman Boulevard on the Long Island road. Mr. Havemeyer's automobile plunged into this hole, and four men were seriously injured Edward Fromer, the driver, so badly that it became necessary to amputate his right leg.

SNAP SHOTS TAKEN ON HAROLD H. BROWN'S RETURN TRIP TO BOSTON.

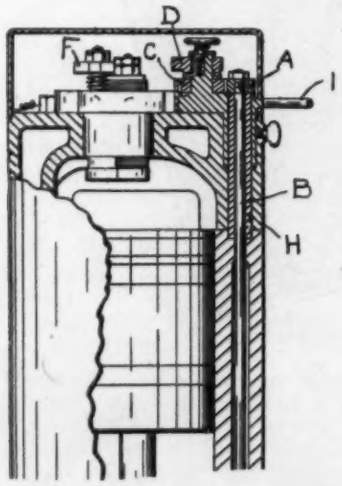
HAROLD H. BROWN'S 12-HORSE-POWER DARRACQ WHICH WON THE HILL CUP IN THE A. C. A. 500-MILE RELIABILITY CONTEST.

Patents

Mechanism for Contact Spark.

No. 711,652.—E. S. Bowen, of Auburn N. Y., assignor of one-half to W. L. Fay, of Auburn, N. Y.

This sparking apparatus, as shown, is located on the cylinder head, and is actuated by vertical shaft driven by bevel gearing from the crank shaft. A pinion *A*, on the vertical shaft *B*, meshes with another pinion *C*, to which is attached the snap cam *D*. This cam works against a spring-controlled stem *E*, a projecting finger from which attacks the oscillating finger *F*, attached to a vertical stem carrying the movable electrode inside the cylinder at its lower end. When the snap cam pushes rod *E* outward, it allows spring *G* to draw the electrode into contact with a fixed insulated point, from which it is abruptly separated by the return of *E*, whose spring is much stiffer than *G*, when the cam leaves it. In order to vary the timing of the spark, the second pinion *C*, instead of being on a fixed stem, is carried on a support which swivels about the bushing *H* on the shaft *B*, and may thus be shifted by the handle *I*.

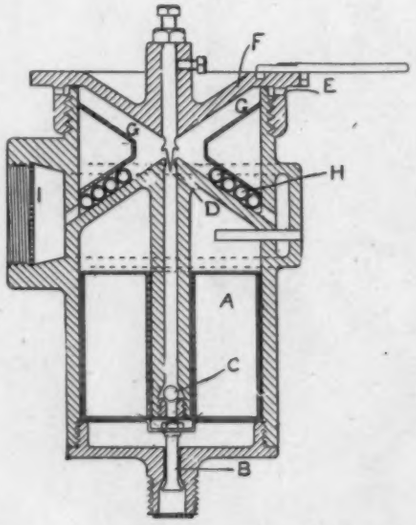


BOWEN CONTACT SPARK MECHANISM.

Float Feed Carbureter.

No. 711,902.—J. B. & D. M. Leppo, of Mansfield, Ohio, assignors of one-third to Thomas Hall, of Mansfield, Ohio.

This carbureter has the float *A* acting on the valve *B*, and provided also with the ball check valve *C*, through which the gasoline passes on its way to the spraying nozzle *D*. The air enters through apertures *E* in the loose screw *F*, by screwing which up or down the space for ingress of the air into the annular conical chamber *G* may be increased or reduced. The circles *H* indicate wire helices coiled in rings on which the gasoline spray impinges and which assist to break it up. This action is further assisted by the shape of the air passages in directing the stream of air with great force upon the gasoline nozzle The carbureted mixture passes out through a wire gauze screen at *I*.



LEPPO FLOAT FEED CARBURETER.

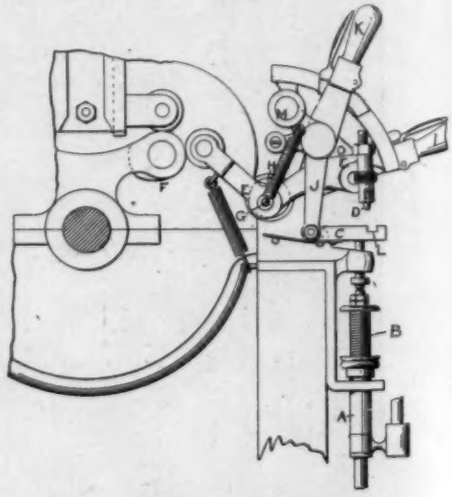
Feed Controlling Device.

No. 710,087. W. W. Tuck, of Richmond Hill, and August Wassman, of Astoria, L. I.

This device applies to oil motors whose charge of fuel is injected into the cylinder by the stroke of a small pump, and its object is to provide means for varying the length of the pump stroke as desired, and also for arresting the stroke early or late as desired, the latter function being performed either by hand or automatically by a governor when the engine's speed becomes too high.

In the drawings, *A* is the pump, whose plunger is worked in opposition to the spring *B* by the finger *C* and adjustable tappet *D* on the end of the rock-lever *E*. The latter is worked by the cam *F*, and is pivoted eccentrically at *G* on the short shaft *H*, which may be rocked by the hand lever *I*. In this way the tappet, acting on different parts of *E*, may impart a slightly longer or shorter stroke to the plunger.

The finger *E* is pivoted to the end of arm *J*, which may be swung to the right or left by handle *K*. Although the drawing does not clearly show it, the intent of the invention is that tappet *D* shall, near the end of its movement, drop into the notch *L*, thus ceasing to act on *E*; and the farther to the left *E* is carried by arm *J* and handle *K*, the sooner *D* will drop into *L*. A weight attached to the flywheel, and not shown, is arranged to push upwardly against roller *M* when the engine races, and this swings *J* to the left independently of *K*.



TUCK FEED CONTROLLING DEVICE.

Bicycle Motor.

No. 710,329. R. C. Marks, San Diego.

A motor whose flywheel is made with a solid web, which serves as a cover for the valve gear casing. A pinion next to the flywheel drives two gears, one for the spark timing and one acting on the exhaust valve.

MOTOR BOATS

GASOLINE POWER APPLIED TO LIGHT-HOUSE TENDERS.

Special Correspondence.

NEW HAVEN, CONN., Nov. 17.—Of the 75 or more gasoline motor boats with which New Haven harbor has now become populated, equipped with motors of from 3-4 to 50 h.p., there is none which is attracting so much attention as the 16-ft. double-ender launch which was recently completed by Captain Frank C. Hall, the keeper of the Southwest Ledge Light, directly off New Haven harbor.

This boat draws attention from boatmen for two reasons; first, because of her style of construction, and secondly, because of her model and great power. As for her construction she is of what the down-easters term the "edgewise" build; that is to say, she is built of white pine strips 1 1-4 in. deep and 7-8 in. wide, nailed one on the other, from the keel to the gunwale. About thirty-six nails have been put through each strip down through the next two strips below, care being taken to place the nails in each strip so as to avoid those already driven. There are no ribs in the boat, and yet by this system of construction she is as stiff as could be desired.

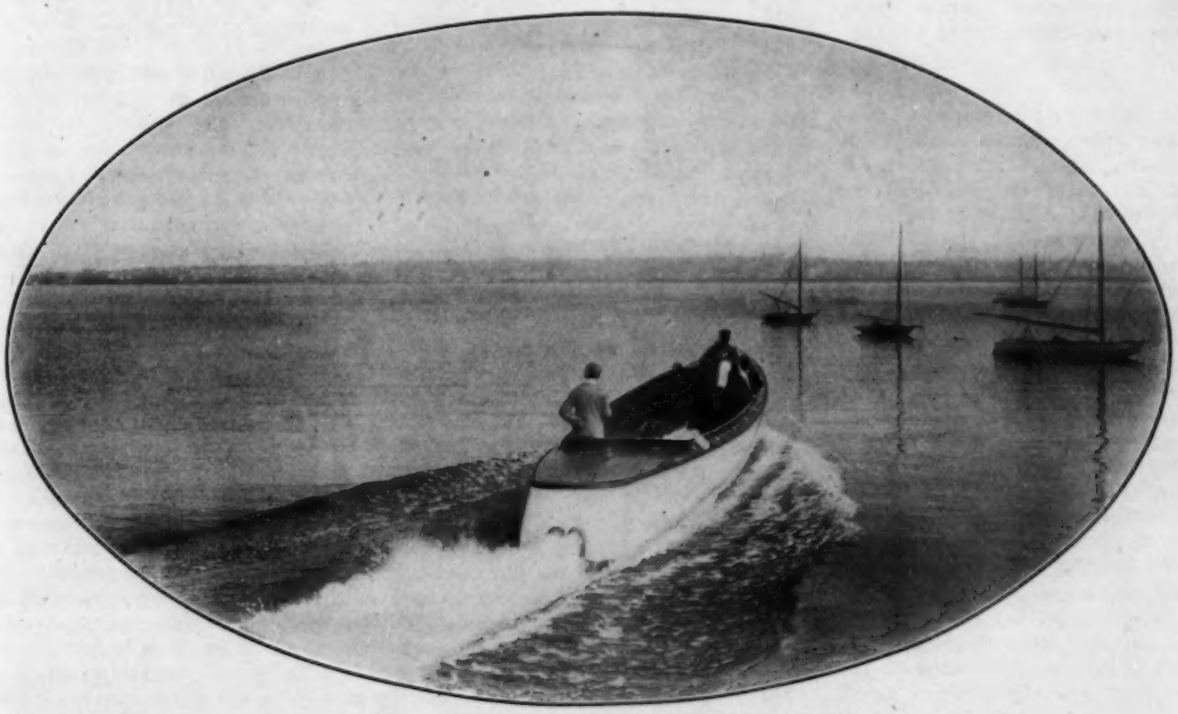
This method of boat construction is said to have been introduced into Nova Scotia about twenty-five years ago, and so popular has it become in that section and around Boston, that many of the small boats are built after it. The fastenings are long, slender brads of composition.

As for the model of Captain Hall's boat, she is not handsome. She is 16 ft. long, 4 ft. 4 in. wide, and draws 18 in. Into this boat has been put one of the 3 1-2 h.p. engines, made at the works of Captain Chas. W. Foster, in this city, and she is also fitted with the Foster reversible propeller. The consequence is, with this tremendous amount of power, for such a small boat, she does not run any faster, in smooth water, and, in fact, not as fast, as she would if she were some feet longer and better proportioned for the power that propels her. When the gasoline is turned on she drops her narrow stern down in the water, and sticks her bluff bow up in the air, in a manner that would distress the man looking for speed.

But this is just what Captain Hall, who is a down-easter, and familiar with the sterling qualities of a Grand Banks dory in rough weather, is after. This launch, which he has just completed, is to be used in making passages from the Ledge to this city at all seasons of the year, and in all weathers, and she is also to take the place of a sailing and rowing boat in setting a string of bug lights along a mile of breakwater off this harbor. These lights have to be set—blow high or blow low—and no matter how high the sea is running. The launch is made short and bulky and high bowed, so that she will throw the seas to one side and not ship them, when she is doing rough work; it is calculated that her stern will drop when she is running so that her screw will keep under water when she is pitching into a heavy sea; she has been given the powerful engine so that she will make light work of and fair headway in a gale of wind; and lastly, she has been given the reversible propeller so that she can be brought to a fixed position almost instantly, and held there while a landing is being made from the turbulent waves to the breakwater; on a lantern-tending trip, for instance.

High-Speed Gasoline Launch.

The launch here illustrated is the latest work of H. J. Leighton, of Syracuse, N. Y., the builder of many very fast gasoline launches. She was specially designed, both in hull and engines, for a higher speed than thus far attained by any of the Leighton boats. The hull is 55 feet over all by 8 feet breadth, and the engine has eight cylinders, giving 120 horse power. The launch was built at Brewerton and taken to Onondaga Lake. In her early trials on the river, which is narrow and shallow, she made a speed of 23 miles, and considerably better is expected when she is in her best condition. Mr. Leighton has under way a hull of the same length to carry a 60 horse power engine.



LEIGHTON 120 HORSE POWER GASOLINE MOTOR BOAT IN SERVICE ON LAKE ONONDAGA, N. Y.

Marine News Notes.

Engines from the shop of J. W. Lathrop, at Mystic, were recently shipped to Yucatan and to San Francisco.

Two launches built by E. A. Ely, of Middletown, have been crated and forwarded to New York, where they will be shipped to Paris this week.

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SATURDAY, NOVEMBER 22, 1902.

BASIS FOR SPEED COMPETITIONS.

Up to the present time, public automobile competitions in this country have been for the most part of three kinds—track races, endurance tests, and hill-climbing competitions. No hill-climbing contest of real importance has yet taken place, the nearest to it being that at Nelson Hill last year, in which frequent blockades and breakdowns deprived the results of comparative value. Several contests have been organized by local clubs, with benefit to the sport of automobiling, but anything approaching in entries and popular interest to the corresponding affairs in France lies yet in the unseen future.

Endurance tests, on the other hand, are becoming increasingly popular, but their rigor has been found to depend, with the low speed limits necessarily enforced, altogether on the weather and the condition of the roads. The risk that the run will be a complete fiasco, with too severe conditions, or will degenerate into a mere excursion on dry macadam, is one which takes much forethought to avoid. The short endurance test is likely to partake more and more of the character of a club outing, and only the long affairs, covering from 500 to 1,000 miles of all kinds of roads, are likely to attract or deserve the serious attention of the public.

Of track races as at present conducted, it is enough to say that they amuse the spectators without informing them in any serious way.

The best test of merit yet devised for the automobile is the long-distance road race, under suitable restrictions as to weight and repairs. Unfortunately, this test is not easy to apply on the highway, and in this country is not likely at present to be received with favor by the public. The endurance test comes next; but, as before remarked, to be at all instructive this must cover so great a length of route as to be impracticable save once or twice a year and under the auspices of a strong organization. Is there no other kind of test, which will give information worth having, and which can be organized without too formidable an outlay of money and time? We believe there is.

Such a test would be one of the aggregate efficiency of the motor and transmission system, as shown in speed tests on straight away macadam. The speed, as such, instead of being "the whole thing," would then be but one out of several factors in determining the result aimed it, namely, the apparent work done by the motor in propelling the known weight of the car a given distance at its maximum speed. By "apparent work" is meant the piston displacement in cubic inches, or the product of the piston area, the stroke, and the number of power impulses performed during the vehicle's travel. Of two engines having the same piston displacement per unit travel, that developing the greater power is the more efficient; and, similarly, of two vehicles of equal weight, that traveling the given distance with the smaller total piston displacement is the more efficient in its engine or transmission system, or in both. For the sake of simplicity, no attempt would be made to obtain the efficiency of the engine separately, but only that of the motor and transmission system together.

In such a test, the results would be expressed by a formula in which the numerator would be the total weight of the vehicle and passengers, multiplied by such a function of the speed as would express the ratio of tractive effort to speed, and the denominator would be the piston displacement per unit of distance, or some number proportional thereto, such as the product of the square of the bore, the stroke, the number of cylinders, and the ratio of engine speed to rear wheel speed, divided by the rear wheel diameter. Doubtless also it would be necessary to introduce other factors, to put the racer, the touring car, and the runabout on an equal footing. A large car will have less friction and consequently more speed, per horse power per ton weight, than the small car, so that some function of the weight, to be determined by experiment, would be better than the simple weight. The relative power of a motor falls off somewhat with increased piston speed and smaller cylinders, so that a logarithmic function of the bore and speed would be desirable. To discourage the entering of freak machines, the dead weight of body, passengers, and ballast (if any), should be a certain minimum percentage of the working or stripped weight of the car.

Such a formula, properly worked out, would be comparatively simple to apply, and it would give at once the *relative* efficiency of the machine. By introducing suitable constants for pressure and point of cut-off, it could be applied to steam as well as to gasoline machines, and it would fit equally all classes of vehicles, from the smallest to the largest, from the slowest 'bus to the swiftest racer.

In the form here proposed, it would, of course, be unsuited to merely popular contests, in which the fastest car must be the winner; but it does not seem impossible that such a formula could be transformed and adapted to handicapping purposes, in which case it would take its place on a par with the formula for measuring racing yachts, and put track racing on a scientific basis at a stroke. Is not the subject well worth the attention of the A. A. A.?

SAFE LIMIT OF SPEED?

If any proof be needed that the present limits of speed for motor vehicles are far below all reasonable requirements of safety, it may be found in the record of the Reliability Run; in which, counting the convoying vehicles as well as those competing, upward of a hundred cars traveled a distance of 500 miles each without one accident to an outsider, much less to the riders. The conditions of this run are worth a close examination as being intimately associated with that practical solution of the speed question which is at present most imperative.

In the first place every car was in the hands of a competent driver; some of them were reckless to a degree, being known for their daring and their predilection for racing on both track and road, but all were thoroughly conversant with the capabilities of their cars. The cars themselves were presumably all in perfect condition, as every one was prepared to make a no-stop record in the face of possible difficulties and to meet any emergency of unknown roads. The traffic conditions of roads and streets were exceptional, as they were crowded with spectators in vehicles and on foot; the city streets being in many cases jammed in the neighborhood of the controls. The crowds of children attracted by the novel procession constituted a most serious danger, not alone from their numbers in the roadway, but from their daring and reckless conduct. On the open road it was evident that the notice of the passage of the concourse had in no way acted to keep the drivers of horses at home, as all the ordinary traffic was under full way, ladies in carriages, farmers with their loads of apples and grain, farmers' wives with their shopping in the bottom of the buggy, children and old people driving.

The speed, while reduced in many cases to well below the legal limit in entering the control towns, was above the limit in the majority of cases; for instance, a car which passed none and was passed by

many in the departure from New York, made the 14 mile mark, the City Island road at Bartow, within 50 minutes from the start; the legal limit for most of the way being but 8 miles. A great deal of the speeding between towns, to say nothing of pretty high speeds in the smaller towns, was at rates of from twenty-five to thirty miles; the higher figures being mainly those of the outside cars.

While speed is undoubtedly one of the prime factors of safety, it is—of course within reasonable limits—but second to two other factors, the condition of the car, both in its outfit of brakes and controlling gear and their perfect maintenance; and the skill and judgment of the operator. The run proves that good cars may be driven by capable operators at high speeds without undue danger to other users of the road; while a low speed limit, even if rigidly enforced, offers no real safeguard against the imperfect car and the unskilled driver. With such provisions for the inspection of cars and the examination and licensing of drivers as are now favored by the leading automobile clubs a material increase above the present speed limits would be perfectly safe.

ANNUAL MEETING AND ELECTION OF THE A. C. A.

The regular ticket of officers presented by the nominating committee of the Automobile Club of America was elected without opposition at the annual meeting of the club held at the club rooms on Monday night. The new officers are as follows: President, Albert R. Shattuck; First Vice-President, Winthrop E. Scarritt; Second Vice-President, James Stillman; Third Vice-President, W. K. Vanderbilt, Jr.; Treasurer, Jefferson Seligman; Governors, to serve three years, Col. John Jacob Astor, George F. Chamberlin and Peter Cooper Hewitt; Governor, to serve one year, Harlan W. Whipple.

Secretary Butler's annual report showed that the club has 324 active members and 68 associate members.

CONTEST COMMITTEE'S RECOMMENDATION.

A very interesting report was submitted by the Contest Committee on the 500-mile reliability run, in which were set forth a score of recommendations for future contests. The more important among these were that the award of certificates be discontinued, that medals instead of cups be offered, that observers be changed daily, that competition among contestants for first arrival at controls be discouraged, that no time allowances be permitted, that the emphasizing of no stops be avoided and conditions meeting the average touring conditions be made, that after the contest the cars be exhibited for four days in the condition in which they arrive, and that the retail prices of the cars be taken into consideration in future systems of classification.

Eagle Rock Hill Climbing Contest.

Annual Thanksgiving Event of the Automobile Club of New Jersey Promises to Be Full of Interest.

There is promise of a large number of entries for the hill climbing contest that is being promoted by the Automobile Club of New Jersey, to take place on Thanksgiving Day, November 27. Among the contestants will be many who were in the race held in November of last year, and several whose machines have never been given the test of hill climbing under official direction.

Eagle Rock Road, near Orange, N. J., is the course selected. It is one of the severest hills in the East, and became famous in the halcyon days of cycling. It is a mile and one-eighth in length and has an average grade of 14 1-2 per cent. The steepest grade is 18 1-2 per cent., and it will call for all that a motorist has of skill as well as a good share of the power that his machine can exert; for this grade is on a curve, close to the top of the hill. Last year, the winning automobile slewed across the road when it struck the curve, and for an instant was beyond its operator's control. There is one other curve in the road, but it does not present those admirable difficulties so much sought for hill climbing contests. The highway, itself, is of good macadam, free from ruts and loose stones.

TIMED BY ELETRIC DEVICE.

A Mors timer has been borrowed from the Automobile Club of America. It permits of only one automobile in the contest at any one time. Immediately that one car has passed the tape at the top of the hill or has dropped out of the race, another will be started. S. M. Butler, secretary of the Automobile Club of America, has been asked to act as starter. Three men will be invited to assume the duties of judges.

For prizes, the New Jersey Automobile Club has offered two cups, one each for the gasoline and steam classes. There is no entry fee, and any machine may take part in the contest if it shows up at Eagle Rock by 10 o'clock on Thanksgiving morning.

Last year, W. J. Stewart, of Newark, won the first prize for steam carriages in 2 minutes 43 seconds. It was claimed at the time of that contest that the time made by Mr. Stewart established a world's record. B. L. Wright, of Orange, Mass., crossed the tape fourteen seconds after Mr. Stewart. For gasoline carriages, C. E. Duryea, of Reading, Pa., won the first prize in 3 minutes 54 1-2 seconds. John M. Schmidt, of East Orange, was second.

The New Jersey Club hopes to make an annual feature of the hill climbing contest. It has been offered the hearty cooperation of the Automobile Club of America.

President Shattuck, in his report as chairman of the Good Roads Committee, reviewed the progress made in road improvement, especially in and around the Metropolitan district during the past year. By means of subscriptions raised by William C. Osborn, a road has been built around Nelson Hill in Putnam County, N. Y., near Peekskill, where the hill climbing contest took place in the New York-Rochester endurance contest last year, so that it is possible now to make a trip up the east bank of the Hudson River in an automobile of moderate power. The club contributed $250 toward the construction of this piece of road.

The activity of the members of the committee during the highway legislation at Albany last winter and the assistance given to the steel roadway experiments now being undertaken in Murray street, New York, and later to be tried in St. Nicholas Avenue, or in Seventh Avenue, were also summarized.

A letter from State Engineer Bond was read, showing that since the passage of the Highbie-Armstrong State Aid Act about 156 miles of macadam roadway has been completed, that 200 miles are in process of construction, that plans for the improvement of 82 pieces of road aggregating 310 miles, at a total estimated cost of $2,600,000, have been approved, and that petitions have been received for the construction or improvement of about 1,900 miles.

The Scarritt, Chamberlin and Hill Cups, offered for the vehicles making the second, third and fourth best records in the 500-mile reliability run, respectively, were placed upon exhibition in the club rooms.

Speed Records Smashed.

During the past two weeks speed records have been twice broken. Henry Fournier lowered Vanderbilt's world record of 29 2-5 seconds for the flying kilometer by 1-5 second, establishing also a mile record of 47 2-5 seconds, and a few days afterward Augières made a mile over the same course in 46 seconds. Augières is said to be a pseudonym hiding the identity of a wealthy Parisian merchant. The automobiles were in both cases Mors machines. The Vanderbilt record was also made with a Mors machine.

Winthrop E. Scarritt, president of the American Automobile Association, predicts that there will be 50,000 buyers for the 35,000 automobiles which, it is estimated, will be manufactured here for the 1903 market.

Correspondence

Idaho Reliability Run.

Editor THE AUTOMOBILE:

Sir:—Lewiston, Idaho, recently asked the automobilists of Spokane to bring their machines to a fair it had promoted. Four machines were sent by rail. After these had gone, I decided I should go, making the trip overland in my Duryea phaeton, and take with me my wife and 2-year-old boy. At 2 p. m., October 15, we rolled out of Spokane. It was a beautiful day, but there were suggestions of rain in the air. Three miles out we struck a heavy grade, two miles long, but my machine took the hill magnificently. We ran through Spangle, eighteen miles from Spokane, Rosalia, and into Oaksdale. We missed the road near Oaksdale, losing six or eight miles, but reached this town in fine condition. Here we stopped for the night, having made the run of sixty miles in about four hours.

In the morning on awakening, we heard the patter of rain. We were on the border of the Poluse hills, remarkable for their fertile soil, slippery mud and heavy grades. Their number, too, seems endless, and we were constantly climbing and descending hills. The rain, soon after we started, was a steady downpour. The roads had been cut up and made deep in dust by the wheat-hauling wagons. My machine soon began to run hard. I would run up a 5 per cent. grade on the high gear, which is arranged for 30-mile speed. By 10 o'clock we were involved in a combination of rain and mud, this the nastiest, slippierest, I ever saw. We struck hill after hill, where the gradometer showed from 15 to 28 per cent. The engines never faltered a second, and furnished plenty of power, but the wheels were slipping incessantly. I wrapped the rear wheels with pieces of a grain sack I found beside the road. This stopped most of the slipping. At noon we reached Colfax, where I procured some rope and powdered resin. The next hill we struck I fixed up the wheels with these. It was a great help, but still there was much slipping. At 4 p. m. we reached a flat country, and what a luxury its level, though muddy roads seemed! At 6 p. m., while running along easily in the dark, we came to a violent standstill. I found a broken connecting rod. The piston had jammed and I was forced to break it up.

We obtained lodging for the night at a farmhouse nearby, after fixing up the machine so that it could run with two cylinders. I was compelled in the morning to walk four miles over the hills to get two gallons of gasoline. The rain had ceased during the night. We left the farmhouse about noon. Near Uniontown we climbed two steep hills with credit, and at 2 p. m. we reached the bluff overlooking the valley of Lewiston. This is one of the most beautiful scenes in the Northwest. Lewiston lay below us 2,000 feet, the road winding down for six miles. The ferryboat, on account of the shoals in the Snake River, compelled us to run about 100 feet through water. After taking off about 200 pounds of mud the next day, I entered the 4-mile race with my crippled automobile, and won second place.

The return home was by another route, longer, but with better roads and more comfortable grades. The first day's run was eighty miles and at 5 p. m. the next evening we saw the lights of Spokane before us. The run out was 127 miles and the return 147. At Lewiston, my machine had been run about 15 miles. So in all, my mileage was about 300. I consider this an endurance run which reflects a good deal of credit on my automobile.

GEO. E. BARTOO.

Spokane, Wash.

Trouble Betrayed by Sound.

Editor THE AUTOMOBILE:

Sir:—In one of your recent issues I noticed an editorial regarding the care of automobiles, in which I was very much interested, and which I find to the point. I am a locomotive engineer and the owner of a gasoline carriage. When on a locomotive an engineer takes notes of the happenings during a run, and at the end of his division he makes out a report. Then the shop men go over the engine and see that she is in first-class order before she starts on the next trip. This, I find, is a first-class way to keep an automobile in shape; but instead of making out a report, I get into my overalls and go over the auto myself. I know that every man cannot do this, or may not want to, but he could take notes of the different sounds of his machine during his run, and make a report to his driver or repairman, and if that were done we would not have half as many accidents as we read about every day. I have had only one accident with my machine, and that was when I first ran it, and when I was not familiar with the way the crank was oiled, through a small pipe. This was stopped up when I received the machine, and though I oiled the crank, the supply from the cup could not get down to it after the oil put on was used up. The result was that the crank ran hot and I broke the connecting rod. I made a new one, however, and have since had no trouble, as I am very careful when starting for a ride to see that all oil passages are open, and I have found it the greatest advantage to make sure that my brakes are all in first-class condition before starting.

D. W. MCELROY.

Dallas, Tex.

Barney Oldfield never operated an automobile until ten days before the Detroit meet, when he drove the Ford-Cooper racing machine in 1 minute 4 1-5 seconds for his fastest mile and five miles in 5 minutes 28 seconds.

A 1,000-MILE TOUR THROUH PICTURESQUE NEW ENGLAND VALLEYS.

Special Correspondence.

WATERTOWN, CONN., Nov. 15.—Doctor and Mrs. E. K. Loveland, of this place, returned a few days ago from a long and interesting automobile tour covering a period of five weeks. Leaving here on September 29, they followed northward through the Naugatuck Valley, crossed over to the Housatonic Valley and followed it to Pittsfield, Mass., and then drove across through New York State to Albany and Saratoga Springs. They took in Lakes George and Champlain, crossing both on steamboats, with their carriage, and then drove through the heart of the Green Mountains to Middlebury, Vt. Crossing Lake Champlain to Burlington, they toured across Vermont through Montpelier, the capital, and Williamstown, where snow was encountered, and on to the Connecticut River, which they followed down through Massachusetts and Connecticut to Hartford, whence they crossed over through New Britain, Bristol and Thomaston to Watertown.

CONDITION OF THE ROADS.

Commenting on the tour, Dr. Loveland says that the roads in Massachusetts were of fine macadam nearly all the way, and in Vermont and New Hampshire good gravel roads were found occasionally, with sometimes a strip of State highway. While passing through the Hudson Valley, in New York, blue clay roads were encountered, and at one place it was necessary to drive about four miles through mud that reached the hubs. The mud so worked into the gear of the machine that the gears were worn out and a new set was ordered by telegraph from Burlington. This was the only mishap that was encountered upon the entire trip, which covered more than 1,000 miles.

Laying Dust with Tar and Oil.

Henry H. Morgan, the United States Consul at Lucerne, has written the State Department concerning tests made in Monte Carlo with oil and tar to lay dust. Two processes of using tar were employed. One was by means of a peculiarly shaped sprinkler which distributed the material like a fine rain over the road. The other was by means of throwing hot tar in small streams as from an ordinary sprinkling cart. The macadamized roads were swept clean and the hot tar spread over them in a thin layer. In another trial when the tar began to cool, fine sand was thrown over it. This road was then closed to traffic for a few days.

A similar trial in Geneva in July was very successful. On August 16, an inspection found that the highway was not slippery, was extremely hard, and did not bear the marks of horses' hoofs. Rainstorms, which had been frequent in the interim, had done no damage. The cost was about one cent per square foot.

TRANSCONTINENTAL ROAD FAVORED BY A. A. A.

PART OF ITS WINTER PROGRAM.

Directors Decide to Present a Special Bill to Congress and Ask All Automobile Clubs to Urge Its Passage—Membership Fee Reduced to $1 Favors State License Law.

Directors of the American Automobile Association, at a meeting held in the clubrooms of the Automobile Club of America on Monday afternoon, decided to give the support of the organization to the project of a National highway extending from the Atlantic to the Pacific oceans. The matter will be taken up as a part of the winter work of the Association, which will endeavor to secure the co-operation of all of the automobile clubs to make the suggestion of General Nelson A. Miles a reality. The route proposed is from Boston to Albany, up the Mohawk Valley, along the south shores of the Great Lakes to Chicago, thence over the old overland route through Salt Lake City to San Francisco.

Although several bills have been introduced in Congress providing for National aid in constructing such a highway, none has been passed, and the directors of the A. A. A. determined to have a new bill drafted and to call upon all of the automobile clubs to urge the Congressmen from the several States to support it.

ORGANIZATIONS REPRESENTED.

The meeting was presided over by President Winthrop E. Scarritt. Other representatives present were Albert R. Shattuck, President of the Automobile Club of America; Frank G. Webb, of the Long Island Automobile Club; W. T. Stewart, of the Automobile Club of New Jersey; Dr. Julian A. Chase, of the Rhode Island Automobile Club, and S. M. Butler, Secretary of the A. A. A. and the A. C. A.

Great efforts are to be made to increase the membership of the organization, and as an inducement for members of clubs throughout the country to join the Association, it was decided to call a special meeting of the Association for December 9 to take action upon a recommendation that the individual membership be reduced from the present fee of $3 to $1 a year, the club affiliation to remain at $10. An amendment of the by-laws will be necessary.

The Cleveland Automobile Club was elected to membership at Monday's meeting, and applications from the North Jersey Automobile Club and the San Francisco Automobile Club were received, to be acted upon at the next meeting.

The subject of the local measure before the Aldermanic Board of Greater New York, providing for the examination and licensing of motorists, came up for discussion, but was referred to the committee on legislation, of which Jefferson Seligman is chairman. It is expected that a bill will be prepared and presented at Albany in the winter to be enacted into a State law covering the matter.

The Board of Directors took no action regarding the severe sentences recently imposed upon several motorists for alleged excessive driving, the Automobile Club of America having declared its readiness to lend its aid upon request of the counsel for the defendants in the cases.

Among the results accomplished by the Association since its organization in Chicago last March were the suppression of an automobile race meeting at Brighton Beach that was being promoted for speculative purposes, the issuance of licenses for a number of race meets, and the securing from the Treasury Department of special privileges to tourists taking vehicles abroad or bringing foreign machines into this country for periods not exceeding three months.

INTERESTING MATINEE RACE MEET AT HAMPDEN PARK.

Special Correspondence.

SPRINGFIELD, MASS., Nov. 14.—The first automobile meet in Western Massachusetts was held in Hampden Park this afternoon under the direction of the Springfield Automobile Club. Fifteen vehicles competed in the races, while more than a score of others, driven by members of the club and other enthusiasts from Springfield, Westfield and Holyoke, were lined up in front of the finish line. The meet was an amateur affair, intended for automobiles of local ownership, including Stevens-Duryeas, Automotors, Knoxmobiles and Warwicks, all made in Springfield, while several Locomobiles and one Crestmobile also entered.

HAYNES AND NESTMANN VICTORS.

The feature of the meet was the performance of the Stevens-Duryea carriages. In the event specially for them, S. L. Haynes and President Harry G. Fisk, of the Springfield Automobile Club, ran a pretty race for five miles, Fisk leading up to the third, when Haynes took the lead and held it to the finish. The time, considering the soft and muddy track, was remarkable, the figures for the five miles being 10:38 2-5, and the best mile, the third, being done in 2:04. Then, in an exhibition mile, Otto Nestmann, in the Stevens-Duryea, in which he reached New York at the head of the seventy vehicles in the recent New York-Boston reliability contest, made two minutes flat, and later, in a three-mile event, beat Hinsdale Smith in the Automotor in which he made the New York-Boston run. Nestmann's time for the three miles was 6:08.

Locomobiles were prominent in the event for steam vehicles, representing five of the six entries. It was for three miles and was won by W. F. Anderson in a 6 horse power Locomobile surrey, in 6:26 1-5, the best mile being done in 2:05.

ONLY WOMAN COMPETITOR LOSES.

The feature of the event for Warwick vehicles was the presence of the only woman competitor, Mrs. E. L. F. Gelder, in a 3 1-2 horse power wagon. She was disabled by the failure of the sparking plug of her machine and finished last, F. L. Gowen winning the three miles in 9 minutes.

C. E. Coan won the judgment race in his Crestmobile. This was a mile event in which the contestants were required to go the distance at as near a 15-mile clip, or four minutes to the mile, as they could. Coan made it in 4:02.

The motor cycle race was the fastest event of the day, Oscar Hedstrom, who has made a reputation as a fast and fearless rider on these noisy machines, winning the five miles in 7:45 4-5, on an Indian motor.

Merrill White won the event for Knoxmobiles, making the three miles in 7:19. His one competitor, Dr. L. J. Gibbs, withdrew in the first mile.

About 400 spectators were present and the weather was ideal, while the track was in fair shape for the season, although muddy on the turns. The club's racing committee, Adolph Geisel, F. S. Carr and S. L. Haynes, was in charge. The officials were: J. E. Cowan, starter; C. W. Johnson, George Merryweather and Dr. H. C. Medcraft, judges and timers.

FIGHT EXPECTED OVER PROPOSED PHILADELPHIA SPEED MEASURE.

Special Correspondence.

PHILADELPHIA, Nov. 17.—The Road Drivers' Association of Philadelphia is making active preparations to oppose the passage through Councils of the proposed ordinance increasing the speed limit of all vehicles within the built-up sections to ten miles an hour. It is urging every horse owner to assist in warding off the dire calamities which the enacting of the proposed measure into a law will visit upon the heads of the beloved public.

These horsemen insist that the present speed of seven miles an hour is ample for them, and that, ergo, everybody else should be satisfied with it. At the preliminary meeting of those directly interested, the drivers were the only ones who failed to send representatives to help formulate an ordinance that would be satisfactory to all. The wheelmen joined in the preparation of the ordinance, and the trolley people practically sanctioned the ten-mile limit, as both classes could not consistently refuse to do, inasmuch as both exceed that rate daily, and have done so for years.

The ordinance will come up in Councils within a fortnight, when there will be a very pretty fight, for many of the city's lawmakers have been converted by what they saw at the George's Hill demonstration and braking contests last summer, and will endeavor to convince the horsemen and their adherents that ten miles an hour is not an excessive maximum for a vehicle so readily handled and controlled as the motor vehicle has been shown to be.

AUTOMOBILE MISHAPS STIR UP THE CONNECTICUT PRESS.

Special Correspondence.

NEW HAVEN, CONN., Nov. 17.—"Left Their Victim to Die." This is a sample of the headlines with which the Connecticut press is teeming since the recent conviction of H. A. Marble for manslaughter in running down John Molz on the Wallingford road last summer. This latest headline, as quoted above, was brought out all over the State, when Elisha Caddicks, a wayfarer, who says his home is in New York, was picked up a few nights ago by the side of the road near Meriden, and taken to the hospital there with a broken thigh.

Caddicks said that he was run down in the road at a late hour in the night by two automobilists who were running their machine at a high rate of speed. He was thrown some distance, he said, and was rendered unconscious, but was finally revived by the two men, who then placed him in a barn and promised to return with medical assistance. But they never came back. Then, Caddicks says, he crawled out into the road and lay there until some one found him and he was taken to the hospital.

SAYS CADDICKS HURT HIMSELF.

The Meriden police sent a detective down here looking for the motorists, who, it was alleged, are in the employ of a New York dry goods house. The detective followed to New York the machine used by these men.

But now comes another story from Meriden, which states that the "deadly" automobile was not guilty, in this case. Two boys have been found who say that they saw Caddicks fall off a bridge and hurt himself in this way, but that they were too frightened to tell any one. Caddicks is recovering.

DUPUY ALLEGED TO HAVE SETTLED.

It is reported and the report may be true, although counsel in the case are out of the city and hence cannot be seen, that Harry Wilfred Dupuy, the Yale senior, who ran down and fatally injured with his automobile last June D. Thorpe Munro, on a bicycle, has paid the family of the dead man $5,000 as recompense for the loss of the husband and father. Munro was attempting to cross the street in front of the motor vehicle. Both machines were being hurried to get clear of an opening draw in a bridge. Munro was a machinist. Dupuy, who lives in Allegheny, Pa., and is the son of a wealthy manufacturer, was fined in the City Court, after the accident, for fast riding, and then a charge of manslaughter was brought against him in the Superior Court. The State Attorney is criticized because he did not bring this case to trial before that of young Marble, alluded to above, as the accident occurred nearly three months before the Marble-Molz affair. Five thousand dollars is the limit allowed by the State of Connecticut as damages for the death of a human being, when caused by the carelessness of another.

The conduct of Dupuy and his party, and their attitude at the time of the accident and ever since, has been such as to commend itself to every one who has taken an interest in the case. Immediately after the accident occurred the young men took Munro home in the automobile, saw that he had proper nursing and attendance, and did everything possible to bring about his recovery. From the first the casualty was regarded by the injured man and his family and friends as an accident. At no time, it is reliably stated, has there been any desire on the part of Munro's family to press unduly any claim against Dupuy. The latter, from the first, rendered every assistance in his power, and his willingness to do more if desired by the family is well known and understood, it is said.

It is said by counsel for Dupuy that the Marble case cannot be regarded as a precedent for the Dupuy case, as the facts are entirely dissimilar. So far as can be learned, the State attorney for New Haven County has not as yet had sufficient opportunity to look into the facts of the case or to determine what action ought to be taken.

APPEAL FILED BY MARBLE.

Notice of appeal has been filed in this county in the case of the State vs. Herbert A. Marble, of New York, whom Judge Case sentenced recently to one year in jail.

JURY AWARDS $1 FOR DEMOLISHED AUTOMOBILE.

Special Correspondence.

PITTSBURG, PA., Nov. 17.—The action of the authorities of Yonkers and New Haven, in dealing with unfortunate automobilists who have brought disaster to themselves and others, is being watched with interest by automobile owners in this vicinity. The final disposition of the W. Byrd Raymond and H. A. Marble cases will be of particular interest, as from the result may be judged what will be the fate of young Dupuy, the Allegheny boy whose machine caused the death of a man near New Haven last summer. Dupuy, who is held under an indictment of manslaughter, belongs to one of the most prominent families here, and is himself one of the most popular club men in this section.

DR. KING'S EXPERIENCE.

The evident determination of some courts of justice not to deal fairly with owners of automobiles who get into difficulty is causing much comment in Pittsburg. The case of H. L. King, a local physician, whose vehicle was demolished by a street car, and who was awarded $1 by the courts, is an evidence of what may be expected in some places. King's machine got stuck in the street car tracks on Ellsworth avenue after midnight a few weeks ago, there being a defective place in the paving which should have been repaired by the Department of Public Works. King was carrying a lamp on his machine, and when he found it impossible to move the vehicle, he ran back a block to warn the approaching car. The motorman paid no attention, and a moment later plunged his car into the machine and completely demolished it. He says he saw neither King nor the lamp on his machine.

The award of $1 for a $2,000 automobile is considered rather unjust, in view of the fact that the owner made every possible effort to prevent the disaster. Dr. King will probably appeal the case.

Fined for Fast Driving.

Foxhall Keene, while driving an automobile on a road near Norwich, Long Island, was arrested by a deputy sheriff, and charged with speeding his machine beyond the lawful limit. Mr. Keene had been signalled to stop, but he refused, and the officer mounted a bicycle and overtook the automobile. Mr. Keene declares he was driving a machine that could not make more than twelve miles an hour as it was geared, and that if he were going at the rate of 20 miles, as the officer declares, he could not have been overtaken by a bicycle. In spite of the testimony of experts, when the case was tried before Judge Franklin at Oyster Bay, Mr. Keene was fined $20. He took an immediate appeal.

Ten Days for Auto Driver.

Following closely on the sentence of W. B. Raymond to six months' imprisonment for responsibility for the collision of an automobile with a trolley car in Yonkers, N. Y., comes the sentence of a second automobilist there. Paul Richards was arrested in Yonkers November 9, charged with running an automobile at a rate of speed greater than the law allows. He was tried the following day and sent to the city prison for ten days. His counsel immediately started with bondsmen to White Plains to apply for a stay pending an appeal to a higher court.

During the trial, it developed that the bicycle policemen have arranged a system for measuring distance and have marked off a number of sections on Warburton Avenue in Yonkers for the purpose of timing automobiles.

Stable Not a Nuisance.

An automobile stable is not a nuisance, according to an opinion given by Justice W. M. Smith, of Arverne, Long Island, in an injunction suit brought by A. Stein to restrain C. Lyons from erecting a storage room for motor vehicles near the Stein residence. Most of the property in the town was purchased or leased under a restrictive building clause designed to protect the owners from the intrusion of buildings other than residences up to a certain standard.

INDUSTRIAL

RETAIL TRADE OPTIMISTIC FOR THE COMING SEASON.

PREPARING FOR MORE SALES.

Cleveland Dealers Expect Them to Double those of Any Previous Year—Permits Granted to Build Sales Establishments—Progress of Old and New Manufacturing Concerns.

Special Correspondence.

CLEVELAND, NOV. 15.—The summer season of 1902 has been an excellent one with the local dealers, as well as with the manufacturers. Many of them have, in consequence, prepared to operate upon a larger scale next year. The many sales in prospect and the demand for the higher-priced vehicles has prompted them to prepare for better things in the future. They believe that there will be more sales of motor vehicles next year than for several years past put together. With the establishment of local salesrooms by the Cleveland factories and the storage and salesrooms maintained by the dealers, the retail business here next year will assume interesting proportions, and some handsome and well-equipped stores and repair shops will grace the best business streets of the city.

TWO BUILDING PERMITS GRANTED.

The building inspector has granted permits to the Cleveland Automobile & Supply Co. for alterations and additions to the old Music Hall, estimated to cost about $6,000; to the White Sewing Machine Co. to erect a brick automobile station on the north side of Rockwell Street, to cost about $35,000.

The American Ball Bearing Co. has arranged to build a small frame addition to its factory on Rockwell Street.

A CHANGE OF NAME.

The Beardsley & Hubbs Co., which some months ago moved from Mansfield, Ohio, to Shelby, has changed its name to the Shelby Motor Car Co., and will issue $50,000 additional stock. The working force will be doubled and in the future the company expects to average about three complete machines each week.

The Peerless Motor Car Co., of Cleveland, which was incorporated in West Virginia some time ago with a capital stock of $300,000, has been authorized by the Secretary of State to do business in Ohio. The officers are as follows: President, M. L. Blanchard; secretary and treasurer, L. H. Kittridge.

CONDUCTING EXPERIMENTAL WORK.

The Amstutz-Osborn Co., which for some months has been experimenting with gasoline vehicles, has been succeeded by the Osborn-Morgan Co. The concern has just completed a new factory building at Case Avenue and C. & P. Ry., where it will continue its experimental work. As soon as the machine has been perfected a new company will be organized and another factory built, as the present concern is preparing to push another line of manufacture.

GENEVA RACER BUILT IN FIVE DAYS.

It is said that the "Torpedo," the Geneva racing machine that won the three-mile race at Detroit on October 25, was built in just five days. It is equipped with a 50-horsepower engine, and is geared high. The order was sent into the drafting department six days before the day of the races, and a train was held two hours to allow workmen to finish the machine. Some of them came as far as Cleveland with it, in order to complete some of the minor parts and test it. It is very doubtful whether another machine in the world has such a history.

SUCCESS OF DISPLAYS AT PITTSBURG EXPOSITION.

Special Correspondence.

PITTSBURG, PA., NOV. 17.—Local dealers are figuring the net profits resulting from sales made this season at the exposition which closed here last week, and each predicts that this season's business will be found to have far exceeded that of any previous one. This result is natural, of course, as more machines have been placed on the market and a greater degree of perfection in construction and finish has been attained.

The automobile exhibits this year were among the most attractive in the two big buildings at the point, and certainly attracted much attention. Many sales were made there to persons whose attention had never been drawn to the operation of an automobile at close range.

The Banker Brothers Co. spent plenty of time and money this year in erecting their stand and had as handsome a line of machines on display as one could see at any of the big automobile shows. The big Peerless car that was placed close to the center aisle of the new building was admired daily by thousands. The Peerless has been one of the best sellers of the season in Pittsburg.

The Pittsburg Automobile Co. made a big display of White steam carriages during the six weeks of the Exposition. The White has been put to all sorts of severe tests in this locality since its introduction last winter, and the showing it has made assures it a place in the Pittsburg market for all time.

The Seeley Mfg. Co. pushed the Panhard to good advantage, disposing of a number of 40-horse power machines. The Winton and Locomobile also sold well, as their reputations here are of long standing, and they need little advertising.

Altogether, the automobile exhibits proved a good feature of the exposition, and when the profits for the short season are finally known there is little doubt that every house in town will be represented there at the annual opening next September.

Standard Single Tube Tire.

After long correspondence, the National Association of Automobile Manufacturers has received assurances from practically all the makers of single tube tires that they will come to a decision on a standard size for their products. They have promised to agree on the same number of lugs and spaces for the rims in order that the tires may be interchangeable.

This is a concession, the importance of which to the owner of an automobile and to the small dealer cannot be overestimated. It means that when one's machine is disabled by injury to the tire that a trip at a distance from a large city, where parts may be easily replaced, need not be discontinued. It means that in the small towns the dealer and repairer need not carry a stock which may prove burdensome.

The Association is confident that similar agreements may be secured from the manufacturers of solid and of double tube tires.

Executive Committee N. A. A. M.

R. E. Olds, of the Olds Motor Works, and Mr. Gibbs, of the Electric Vehicle Co., have been chosen to fill the vacancies created in the executive committee of the National Association of Automobile Manufacturers by the resignations of J. H. Ballantyne and Dane E. Rianhard.

At a recent meeting of the Association these firms were elected to active membership: Sintz Motor Car Co., Grand Rapids, Mich.; H. H. Franklin Mfg. Co., Syracuse, N. Y.; Studebaker Brothers Mfg. Co., South Bend, Ind.; Prescott Automobile Mfg. Co., New York, and Berg Automobile Co., New York. To associate membership were elected: New Process Rawhide Co., Syracuse, N. Y.; Whitney Mfg. Co., Hartford, and Conger Mfg. Co., Groton, N. Y.

Additional Allotments at Chicago.

New allotments of exhibition spaces for the annual automobile show, to be held in Chicago from February 14 to 21, 1903, in addition to those assigned to the sixty-five firms in the list published in the November 8 issue of this paper, are announced as follows: Lindsay Automobile Parts Co., space 94; Frank P. Illsley, 97 and 98; Marble-Swift Automobile Co., 99; Hartford Rubber Works Co., 106; Jackson Automobile Co., 108 and 109; Electric Contract Co., 122; Kammann Mfg. Co., 137; Motor Development Co., 157.

All spaces, except 143 and 158, both of which are small, had been taken by November 13.

An agency for automobiles in Fitchburg, Mass., is to be established by the Iver-Johnson Sporting Goods Co.

Advent of Aultman-Miller Co.

Special Correspondence.

AKRON, OHIO, Nov. 15.—A company which promises to be an important factor in the automobile business of Ohio is the Aultman-Miller Co., of Akron. This concern has been a leading manufacturer of agricultural machinery until recently, when it sold out to a trust. With a large and well-equipped factory it has turned to the automobile industry. Negotiations are pending for the purchase of the factory equipment, patents and good will of the Woodruff Automobile Co., formerly of Cleveland, but which for some months has occupied a factory in Akron, adjoining that of the Aultman-Miller Co. If the deal goes through, it is probable that the Woodruff brothers, who designed the machine, will continue with the new company.

Sandusky Company Reorganized.

Special Correspondence.

SANDUSKY, O., Nov. 15.—The Sandusky Automobile Mfg. Co., which was organized some months ago, has been reorganized. R. S. Thompson and J. J. Jackson, of Cleveland, who were among the original promotors of the company and have withdrawn from the company, their resignations as president and director, respectively, having been accepted. The new officers are James J. Hinde, president; E. J. Cable, vice-president; C. H. Ely, treasurer. Additional capital has been raised and the work of erecting the factory, planned some time ago, will be hurried forward. The Sandusky company has already demonstrated its ability to bui'd successful machines, as several of its productions have been on the streets for some months.

New Enterprises.

W. T. and R. A. Rainey and R. M. Owen have incorporated the American Automobile Storage Co., with $5,000.

An automobile factory to cost $25,000 is to be built at McKeesport, Pa., by Oliver S. Oberlin, who manufactures sewing machines and bicycles.

The Githens Bros., of Chicago, has been incorporated with $30,000 capital, to make and sell automobiles. The incorporators are W. L. Githens, F. C. Donald and James Levy.

The Standard Automobile Co. has been organized in Indianapolis with $100,000 capital and has arranged for the purchase of a plant and the necessary machinery for the manufacture of motor vehicles. The incorporators are: W. W. Spencer, John W. Holtsman and James H. Witty.

A factory is now being equipped in Marlboro, Mass., for the manufacture of tires and other rubber goods, by the Preston Woven Hose and Tire Co., of which H. N. Jacques is treasurer and Charles C Shepherd, superintendent.

The Superior Rubber & Mfg. Co. is installing machinery in its plant at Cuyahoga Falls, and will be in operation as soon as this work can be completed. The company is capitalized at $200,000, and the stock is owned principally in Cleveland and Akron.

The Paterson Automobile Exchange is a new enterprise established by E. D. Carlough and W. H. Chadwick, in Paterson, N. J. The firm will make a specialty of repairing automobiles and selling second-hand machines. It has rented the building at 217-219 Paterson Street.

A company with a capital of $25,000 has been formed in Niagara Falls, N. Y., to conduct an automobile repair shop and storage station. The directors are: F. A. Dudley, Dr. W. R. Campbell, F. W. Haskell, Augustus G. Porter and Frank A. Babcock. W. H. Davey is manager.

The Bristol Motor Car Co. has been formed in Bristol, Conn., and incorporated under the laws of Connecticut, with a capital of $10,000, of which $5,300 has been subscribed. The directors are F. N. Manross, E. R. Burwell, W. L. Neubauer, E. Peck, E. R. Simmons, all of Bristol, and J. H. Jones and Adolph Geisel, of Springfield, Mass.

The Safety Sectional Pneumatic Tire Co. has been organized in Binghamton, N. Y., and incorporated with $500,000 capital stock, for the purpose of manufacturing and selling sectional pneumatic cushion and solid tires, together with wheels and rims, for all kinds of vehicles. The directors are Oscar S. Heller, Charles Miller, Benjamin A. Bauman and Edward C. Inderlied.

The Cadillac Automobile Co., of Detroit, has been incorporated with $300,000 capital stock, to manufacture the Cadillac gasoline runabouts. It is occupying the plant of the old Detroit Automobile Co. on Cass Avenue. Officers are as follows: President, Clarence A. Bloch; vice-president, A. E. F. White; secretary, L. W. Bowen; treasurer, W. H. Murphy; sales manager, W. E. Metzer.

Work on the first automobile factory in Kansas has been begun in Topeka. The building is to cost $2,000, and is to be ready by January 1 for occupancy by Smith Brothers, who have built several machines with gasoline motors, and have received sufficient encouragement in their sales to warrant building a manufactory. They have made a feature of a type of automobile suitable for the commercial traveler, capable of hard usage on rough roads, and of carrying heavy baggage.

The Standard Motive Power Co., of Canal Dover, Ohio, has been incorporated with authorized capital of $10,000,000 and a cash capital of $1,500,000. Howard McNutt is president, Andrew Weis vice-president, W. H. Hoar secretary and Thornton Chase treasurer. The objects are to manufacture locomotives, motor cars and automobiles. The plant will be located in Canal Dover, which gave a large cash bonus and 40 acres of land on which to erect a plant, besides a large subscription to the bonds of the company.

Trade Brevities.

The Reutenber Mfg. Co., of Chicago, has been succeeded by the Western Motor Co., of Logansport, Ind.

James W. Lathrop, a manufacturer of gas engines in Mystic, Conn., contemplates the enlargement of his business to include the building of automobiles.

The Autocar Co., located at Ardmore, Pa., on the main line of the Pennsylvania railroad, is laying plans for doubling its capacity. A large addition to its group of buildings will be completed early next spring, ground having been broken for the improvements within the past week.

The Overman Automobile Co. has withdrawn from Chicopee, Mass., having moved the machinery from its plant there to Bridgeport, Conn., during the last week of October. A number of employes went with the company to Bridgeport, including several of the foremen and machinists.

A new factory, which has been under construction in Abington, Mass., for H. H. Buffum, maker of the Buffum touring cars, illustrated and described in the issue of this paper November 8, is almost completed, and will be ready for occupancy before the end of November. Mr. Buffum has enough orders ahead to keep the factory busy for several months.

Articles of incorporation for the Frank Mossberg Co., manufacturer of bells and wrenches, in Attleboro, Mass., have been filed in Rhode Island. The capital stock is $110,000. Among other manufactures will be motor vehicles. The directors are Frank Mossberg and Charles N. Polsey, of Attleboro; Charles Sisson, J. B. White and Daniel McNiven, Providence, R. I., and J. W. Parmenter, Peabody, Mass.

The Lunkenheimer Co., of Cincinnati, has moved into its new plant near Brighton Station, in the section of the city called Fairmount. There are five buildings in the group, representing an investment of $300,000. The main building is 180 x 130 feet and three stories high. The roofs are of glass and tile. The hollow supporting columns are used for heating, the warm air circulating through them.

The Peerless Mfg. Co., of Cleveland, was succeeded on November 1 by the Peerless Motor Car Co., a corporation organized for the purpose of acquiring the plant and engaging in the business of the old concern, which has transferred its property and good-will to its successor. The new company has assumed the performance of all the contracts of the old one, and the ownership and management of the business will be substantially the same as before.

STORAGE, REPAIR AND SUPPLY STATIONS SPEED LAWS AND OTHER REGULATIONS

ARIZONA

Prescott

Brown Bros.

Tucson

Jas. B. Saeger.

CALIFORNIA

SPEED—By local ordinances limited 4 m. to 12 m. Penalties, not exceeding $500, or imprisonment not exceeding 6 mos. Lamps and Bells—Required by most ordinances. License—In Napa, $10 a year. San Francisco forbids storage of more than 5 gallons of gasoline within buildings.

San Francisco

Lakin St., 909. Leavitt & Bill.
Tremont St., 97. Manufacturers Co.
White Sewing Mach. Co.

Oakland

Leavitt & Bill.
Mobile Co., of America.

San Jose

Osen & Hunt.
Millard Bros.

Sacramento

Jim Banta.
Viking Cycle Co.

Los Angeles

Broadway, So., 108. Locomobile Co., of America.
Main St., 439. Crippen & Church.

San Bernardino

Parker Iron Works.
Williams Cyclery.

Riverside

Magnolia Auto. Co.
Stoner Machine Shop.

Redlands

Redlands Iron Works.

Pasadena

Pasedena Machine Shop.
Hodge Bros.

COLORADO

Denver

California St., 1455. Geo. E. Hannan.
Felker Automobile Co.

Colorado Springs

W. O. Anthony.
F. F. Burnstead.

Pueblo

C. W. Fowler.
Pueblo Novelty Works.

CONNECTICUT

SPEED—Outside city limits, 15 m.; inside, 12 m.; reduced at crossings; penalty for violation, not more than $200. Horns or Gongs—Not required by letter of law. Lamps—Required on all rubber-tired vehicles; must be lighted from 1 hour after sunset to 1 hour before sunrise; penalty, $5. If lights go out, operator "may proceed at 6 m. and give audible signal as often as 500 ft. are passed over."

Hartford

Allyn St., 304. S. A. Miner.
Wells St., 43. Hartford Automobile Station.

New Haven

Goffe St., 105. H. C. Holcomb.
State St., 532. Reichert's Auto. Station.

DIST. OF COLUMBIA

Washington

SPEED—Outside city limits, 15 m.; off car-line streets, 12 m.; on intersecting car-line streets, 6 m. License—Required; fee, $3; penalty, for operating steam vehicles without permit, $1 to $40.
Conn. Ave., N. W., 1124. National Capital Auto. Co.

FLORIDA

Jacksonville

F. E. Gilbert.

GEORGIA

Atlanta

Forsythe St., So., 55. C. H. Johnson.

ILLINOIS

Chicago

SPEED—Everywhere in town, 8 m. Bells—Required, to be sounded at street crossings, etc. Whistles and Horns—Prohibited. Lamps—Required; must be lighted between dusk and dawn. License—Operators required to have license; fee, first year, $3; thereafter, $1. Fine for driving without license, $5 to $25. Numbers or Initials—Not required. Brakes—Two sets required, one independent of driving gear. Special—No machinery may be left running when vehicle is standing in street with no one in charge. In other cities and towns, various local regulations apply.
Calhoun Pl., 4. A. J. Milliman.
Cottage Grove Ave., 5311. C. A. Coey & Co.
Plymouth Pl., 12. S. S. Williams.
State St., N., 285. Chicago Auto. Repository Co.
Superior St., E., 385. North Division Auto. Co.
Van Buren and Oakley Blvd. Hagmann & Hammerly.

INDIANA

SPEED—No state law. Various local regulations 8 to 10 m. in city limits. Fine for violation, $1 to $50.

Terre Haute

S. Seventh St., 25. A. Chaney & Bro.

IOWA

SPEED—No state law. Davenport City Ordinance limits speed to 8 m. Bell and Lamp—Required.

Cedar Rapids

Cedar Rapids Supply Co. J. C. Pickering.

LOUISIANA

New Orleans

Baronne St., 400. Automobile Co., Ltd.
Baronne St., 408. Abbott Automobile Co.

MASSACHUSETTS

SPEED—State law provides outside city limits, fire district or thickly settled part of town, 15 m.; inside such limits, 10 m.; approaching horses, reduce speed if animal shows fright and stop on signal of driver; reduce at crossings. Penalty—Fine not exceeding $200, or imprisonment not exceeding 10 days, or both. Ordinances—Various local regulations in cities and towns.

Boston

SPEED—In city streets, 10 m.; in parks, 8 m.; outside city, 15 m. Lamps—Three required. Parks—Permit required from Park Department.
Columbus Ave., 43 and 45. G. T. Gould.
Columbus Ave., 147-153. A. J. Coburn & Co.
Clarendon and Stanhope Sts. Back Bay Hydro-Carbon Repair Co.
Stanhope St., 66-68. Tremont Auto. Headqts.
Tremont and Berkley Sts. Boston Salesrooms.

Cambridge

Mass Ave., 424. Crest Mfg. Co.
Palmer St., 8-10. Harvard Auto. Co.

Salem

Dodge & Lafayette Sts. Zina Goodell Mfg.

Springfield

SPEED—State law applies. Reduce at street intersections. Lamps—Required 1 hour after sunset; not enforced. Alarm—Required to be sounded as necessary. Parks—Permit required for Forest Park; furnished free; rules accompany permit. No registration.
Dwight St., 36-38. J. E. Cowan, Mgr.

Taunton

Post Office Sq., 4-5. Robertson Auto. Station.

Waltham

Newton St., 136. Waltham Auto. Co.

Worcester

SPEED—10 m. Gong or Horn—Required. State law applies.
Foster St., 43. Worcester Auto. Station, No. 1.
Main St., 671-673. Robinson Auto. Station.

MISSOURI

Kansas City

11th St., E., 320. Day Automobile Co.
Main St., 708. Wit man Co.

St. Louis

Olive St., 3935. Miss. Valley Transportation Co.
Olive St., 4259. Missouri Auto. Co.

NEBRASKA

Omaha

Olds Gas Engine Works.

NEW JERSEY

SPEED—Various city, town and county ordinances, limiting to 6 to 12 m.; penalty, $5 to $200. Lamps—Required in some towns, together with alarm signals. Initials—Required by most of the ordinances.

Atlantic City

Atlantic Ave., 1003. J. C. W. Parsons.
Maryland Ave., S., 12. H. W. Cochran.

Newark

Mechanic St., 27. W. B. Dodge.

Paterson

Broadway, 405. F. W. Stockbridge.

NEW YORK

COCKS LAW—Speed—Outside corporate limits, 20 m.; on bridges, 4 m.; inside corporate limits, 8 m., except where higher speed is permitted by local ordinances; penalty, $50 or imprisonment not exceeding 6 mos., or both. Highway Law (Doughty)—Speed—Outside built-

up parts of towns and villages, 15 m.; in built-up parts, 8 m. Registration—Owner must secure certificate within ten days after getting machine; fee, $1. Initials—3 in. high, ½ in. wide on back of each vehicle. Lamps—2 required, white in front, red in rear; must be lighted 1 hour after sunset, 1 hour before sunrise. Horn or bell required. Brakes—Good and efficient; penalty not exceeding $25. Local Ordinances—The state law prohibits local town and park boards from excluding automobiles from open highways; from placing lower speed limits than 8 m., and from requiring license or permit except from owners of public vehicles.

New York City

7th Ave., 515. Smith & Mabley.
38th St., 136. Standard Auto. Co.
38th St., W., 138. Oldsmobile Co.
38th St., W., 141. Banker Bros. Co.
43d St., W., 38. A. G. Spalding & Bros.
43d St., W., 50. Banker Bros. Co.
44th St., W., 307. Long Acre Auto. Depot.
44th St. and 5th Ave. Westchester Auto. Co.
50th St., W., 239. Alexander Fisher.
51st St., W., 143. Knickerbocker Auto. Station.
57th St., E., 140. John Wanamaker.
57th St., E., 154. Metropolitan Motor Car Co.
58th St., E., 33-39. Barry & Hayes.
58th St., E., 150-152. Winton Motor Carriage Co.
59th St., W., 306. A. Elliott Ranney.
59th St., W., 317-319. Adams McMurtry Co.
60th St., W., 10. Webster Auto. Co.
60th St., W., 38. American Storage Co.
66th St., W., 57. St. Nicholas Auto. Depot.
80th St., W., 250. Pa-delford & Bell.
86th St., E., 205. Yorkville Auto. Station.
89th St., W., 202. West End Storage Co.
98th St. and 5th Ave. E. R. Fisher.
100th St., cor. Broadway. Homan & Schulz.
120th St., E., 175. Chas. Strathman.
127th St., W., 152 West End Auto. Exchange.
127th St., W., 153. Harlem Auto. Co.
Broadway, 1684. Central Auto Co.
Jerome Ave., 1918. Hoffman & Setzer.

Brooklyn

Bedford Ave., 712. Lincoln C. Cocheu.
Bedford Ave., 752. J. W. Mears.
Bedford Ave., 1148. Arthur R. Townsend.
Clinton St., 10. Maltby Mfg. Co.
Flatbush Ave., 342, near Eighth. International Motor Car Co.
Flatbush Ave., 473. Alex. Schwalbach.
Fulton St., 1239. Brooklyn Auto. Co.
Fulton St., 1241. Chas. W. Spurr, Jr.
Schermerhorn St., 58. Patterson & Shaw.

Albany

Central Ave., 97. Auto. Storage & Trading Co.
Pearl St., N., 167. Albany Auto. Works.
Sherman St., 255. C. F. Weeber Mfg. Wks.

Amsterdam

Division St., 8. Gode & Brown.

Buffalo

SPEED—8 m. on built-up streets, 15 m. outside; rounding corners, 5 m. Lamps—All hours after sunset. State law applies in other regulations.
Main St., 873-875. W. C. Jaynes Auto. Co.

Rochester

Exchange St., 74. C. J. Connolly.
South Ave., 150. Rochester Auto. Co.

Syracuse

SPEED, ETC.—See state law. No local legislation.
Onondaga St., W., 110. Hoffman & Weaver.
Warren St., So., 346. Syracuse Auto. Co.

Troy

Fulton St., 359. James Lucey.

Utica

Oneida Square. Miller-Mundy Motor Carriage Co.

OHIO

SPEED—Various ordinances in cities, towns and villages, 5 m. to 15 m.; penalty, $1 to $100. Lamps and Bells—Required by most ordinancees. Registration—No state law.

Cleveland

SPEED—Within ¾-mile from east and west ends of Superior Street viaduct, 7 m.; outside such radius, 15 m. Must stop upon signal from horse driver. License—Required; fee, $1. Numbers—Registered numbers must be attached at rear and kept clean. Lamps—One on each side must be kept lighted during darkness. Bell or Horn—Required, and must be sounded when there is danger of accident. Penalty—For violation of any section, fine not exceeding $50.

Columbus

SPEED—Off of business streets, 14 m.; on business streets, 8 m. Penalty—Fine from $5 to $50 or 30 days' imprisonment. Bells or Horns—One or other required to be sounded when necessary. Lamps—Required after dark. Penalty—Fine not exceeding $50.

Toledo

SPEED—Inside city limits, 10 m.

Cincinnati

SPEED—In streets and parks, 8 m. Horns or Gongs—Must be sounded 100 ft. before street crossings. Lamps—Must be lighted between sunset and sunrise. Brakes—Efficient brakes required. License—None required. Initials—None required. Tolls—Bridge toll, 10 cents. Special—Two vehicles must not travel abreast.
Main St., 640. Special Motor Vehicle Co.
Race St., 807-809. Cincinnati Auto. Co.

PENNSYLVANIA

SPEED—Various ordinances limit it 6 m. to 10 m. Penalty—$10 to $100. Lamps and Bells—Required by a few ordinances.

Philadelphia

Broad St., N., 138. Quaker City Auto. Co.
Broad St., N., 246. Winton Motor Carriage Co.
Broad St., N., 250. Pennsylvania Elec. Vehicle Co.
Broad St., N., 304. Broad St. Auto. Station.
23d and Walnut Sts. John Wanamaker.

Pittsburg

SPEED—6 m. to 10 m. Penalty—$25 to $100. Tax—Single-seated vehicle, $6; others, $10.
Center Ave., 5909. J. P. Oden.

York

SPEED—In city limits, 8 m. Lamps—Must display one or more lights.
George St., N., 14. J. P. Oden.
Market and Beaver Sts. J. H. Snyder.

RHODE ISLAND

SPEED—Law provides that any person driving faster than a common traveling pace in any of the streets of Newport or Providence, or in the compact part of any town or village, or in any road leading from Pawtucket to compact part of Providence be fined from $5 to $20, or imprisoned for 10 days. For racing on roads, or streets, $10 or imprisonment for 10 days. Bells and Horns—One or other required, but must not be used excessively. Muffler—Required at all times on public highways. Initials—In black letters 2 in. high.

Providence

Opposite Union Station. H. G. Martin & Co.

TEXAS

Houston

Main St., 719. Houston Cycle Works.
Texas Ave., 903. Clark & Hawkins.

El Paso

P. L. Abel Cycle Co.
El Paso Cycle Co.

Dallas

D. W. McElroy.
Texas I. & M. Co.

Galveston

Market St., 2120. E. H. Labadie.
Tremont St., 712. J. Christensen & Co.

San Antonio

Commerce St., W., 218. Roach & Barnes Co.
Navarro St., 809. Chas. J. Chabot.

UTAH

Salt Lake City

Main St., So., 23. O. R. Meridith.
2d So. St., W., 62. Wilkes Cycle Co.

WISCONSIN

SPEED—Limited by various ordinances 4 m. to 10 m.; penalties, $1 to $50.

Milwaukee

Broadway, 501. Bates-Odenbrett Auto. Co.

INCREASED FACILITIES.—The Brown-Lipe Gear Co., of Syracuse, has leased from the Lipe estate that portion of the large factory building in South Geddes street which will be vacated January 1 by the H. H. Franklin Mfg. Co. By the securing of this additional space it will be possible to increase the output of the concern about threefold. During the past year the business has shown such a substantial gain that this increase has been necessary.

CHANGE OF NAME.—The title of the Ohio Automobile Co., Warren, Ohio, has been changed to the Packard Motor Car Co. With the abbreviation in the name, the company announces that it has increased its capital and the facilities for the manufacture of the Packard automobiles. This company has bought the interests of Adams-McMurtry Co., 318 West Fifty-ninth Street, and will maintain its New York agency at that location.

LATHE DOGS.—The Billings and Spencer Co., Hartford, Conn., is distributing a small catalogue on the lathe clamp and die dogs made in its factory. The circular contains a price list and is illustrated.

SPARK PLUGS.—Chas. E. Miller, 97-101 Reade St., New York, has just received a consignment of spark plugs from abroad. These plugs have become very popular with automobilists.

CHAINS.—Of sixteen vehicles which were awarded first-class certificates in the recent New York-Boston reliability run, fourteen were equipped with Diamond chains made by the Federal Mfg. Co., Cleveland. These chains were also fitted to the White steam carriage which secured the highest honors in the English 650-mile reliability race.

SPERRY BATTERY.—"Some Facts About the Sperry Battery" is the title of a little pamphlet issued by the National Battery Co., of Buffalo, N. Y., in which the construction of the battery and its efficiency are discussed.

AGENCY.—The Northern gasoline car, made in Detroit, has been placed with A. T. Fuller, Columbus Ave., Boston.

INFORMATION FOR BUYERS.

CLEANING SOLUTION.—A. L. Dyke, of St. Louis, is manufacturing a solution especially suitable for the cleaning of spark plugs.

REMOVAL.—The American Machine Mfg. Co., maker of the Perfection spark plug, has removed from 42 West Second St., Boston, where its quarters were cramped, to the five-story brick building, 251-253 Congress St.

AUTO FITTINGS.—The 1903 catalogue of C. A. Halliday, Oneida, N. Y., has just come from the press. Mr. Halliday is the manufacturer of automobile bodies, seats, tops and trimmings. Several novelties for the next season are displayed.

RAMBLERS.—Four Rambler machines, made by Thos. B. Jeffery & Co., Kenosha, Wis., received first-class certificates in the 500-mile reliability run between New York and Boston. These machines made especially good showing of their endurance, and the drivers found them particularly trustworthy when they reached the steeper hills along the route.

NORTHERN AUTOMOBILES.—A handsome little catalogue of pocket size is issued by the Northern Mfg. Co., of Detroit, Mich., illustrating and describing the Northern gasoline automobiles. These are of the runabout type mounted on artillery wooden wheels. The motor is a four-cycle horizontal, 5-h.p. gasoline engine, and the fuel capacity of the machine is about two hundred miles. The catalogue is very neatly printed and can be had upon application to the company.

HEATING OF TIRES.—The G & J Tire Co., of Indianapolis, has been making a series of tests of the heating of tires. It has been found that the tendency to heat is largely a matter of the principle of construction of the tire and of the ingredients of the rubber. Where the tire heats in cool weather it has been discovered to be due often to internal friction and to overresistance in the side walls when bending. The experiments have given the company opportunity to make improvements in its products.

EYE SHIELD.—The Rhode Island Eye Shield Co., 210 Main St., Pawtucket, R. I., manufactures a new eye shield which should meet with much favor with automobilists and motor cyclists. It is really a combination visor and eye shield. The visor is adjustable to any cap, and the mica shields are so attached to the visor that they can be folded up against the under side of the visor out of sight, when not needed, or can be instantly lowered when needed to afford protection from the dust, as shown. If desired, colored lenses can be furnished to protect the eyes from the strong glare of the sunlight. This shield has the advantage of not requiring the wearer to put up with the annoyance of an elastic band or strap running around the head to hold the shield in place.

OSCILLATING MAGNETO.—The Remy Electric Company announces that it is ready to receive orders for the new oscillating magneto for igniting gas, for gas and gasoline engines. The oscillating magneto is radically different from anything now sold in this country. It weighs slightly more than the familiar magneto for ignition purposes. The construction is simple; the armature is one piece of iron and is not wound with wire. The only wire in the machine is stationary. There is no commutator and brushes or other contacts in the circuit, and while the machine is enclosed any dirt that might get inside would not hinder the operation. The machine is driven either by a cam or eccentric and pitman rod, and is intended to be attached to the engine by the auto builder. It is more difficult to instal than the company's regular magneto, as it must necessarily be fitted and timed to the engine, but the efficiency in operation is believed by the makers to more than offset this, and large sales are expected.

AUTO REPAIRS.—John Van Benschoeten, dealer in automobiles and supplies, 14-20 Catherine St., Poughkeepsie, N. Y., has equipped a machine shop with lathes, drill presses, forge and hand tools particularly suitable for the repair of automobiles.

IMPROVED SPARK PLUG.—A new soot-proof spark plug, which is an improvement over a previous model, is offered by C. A. Metzger, of 12 Clinton St., Brooklyn, N. Y. The insulating material is porcelain, but it is protected from breaking in a new principle. Around the terminal where the danger is from heat, the porcelain is thin-walled and does not touch the metal plug, the maker contending that thin porcelain will stand more excessive and sudden changes of temperature than thick porcelain, on the same principle that a thin tumbler will not crack when boiling water is poured into it, while a thicker glass would. Where the danger of breakage arises from vibration or shock—inside of the knuried brass nut which holds it in the plug—the porcelain, on the other hand, is thick-walled. The terminal wire in the new model is much thinner than in the old one, as it has been found that a terminal rod containing more metal does not cool rapidly enough and is liable to cause premature explosions. The space between the terminal wire and the thin porcelain cylinder and between the latter and the metal plug is so great that short-circuiting from soot deposit on the porcelain is practically excluded. The large exposed surface of the porcelain also contributes to this end, and the plug will therefore be known in the trade as the "soot-proof."

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Advertisements of second hand vehicles or parts for sale, or for Positions Wanted, inserted under this heading at 10c per line of about six words. Remittance must accompany copy.

FOR SALE—Bargains in Second-hand Automobiles. Write for description and prices to C. A. Coey & Co., 5311 Cottage Grove Avenue, Chicago. tf

FOR SALE—Waverley Electric Carriage in fine running order. Twenty-four cell Gould battery. Just repainted. Black body, yellow running gear. Price, $550. W. E. Eldridge, 203 Columbus Ave., Boston. 29

FOR SALE—Steam Automobile with detachable dos-a-dos seat and top. All latest improvements. Powerful hill climber. Run about 1,000 miles, and in perfect condition. No reasonable offer refused. J. S. Morrill, Laconia, N. H. 22

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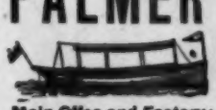
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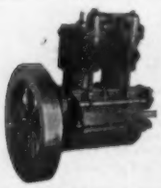

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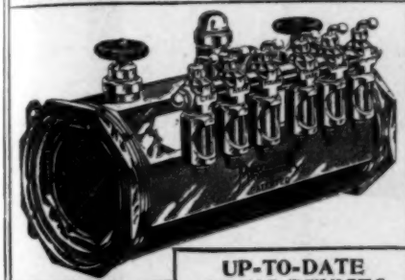

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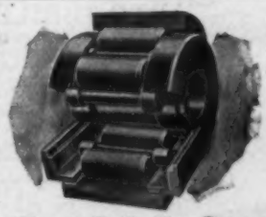

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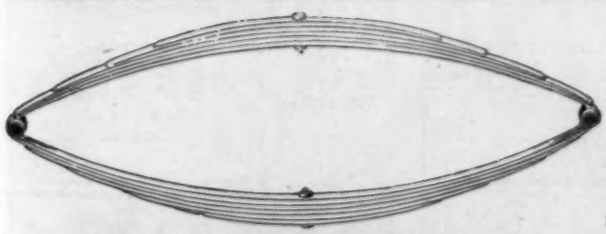

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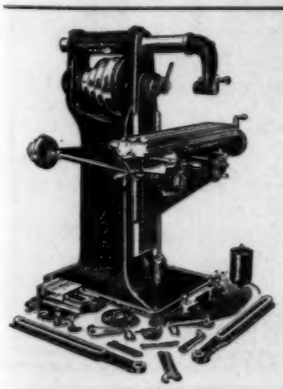

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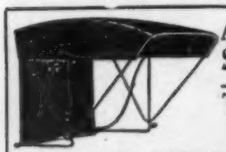

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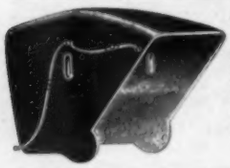

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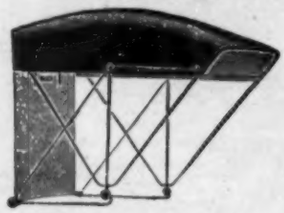

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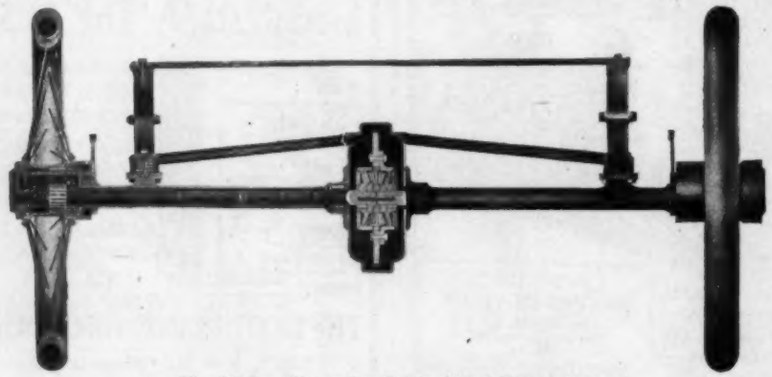

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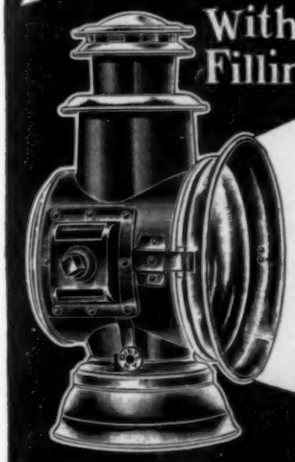

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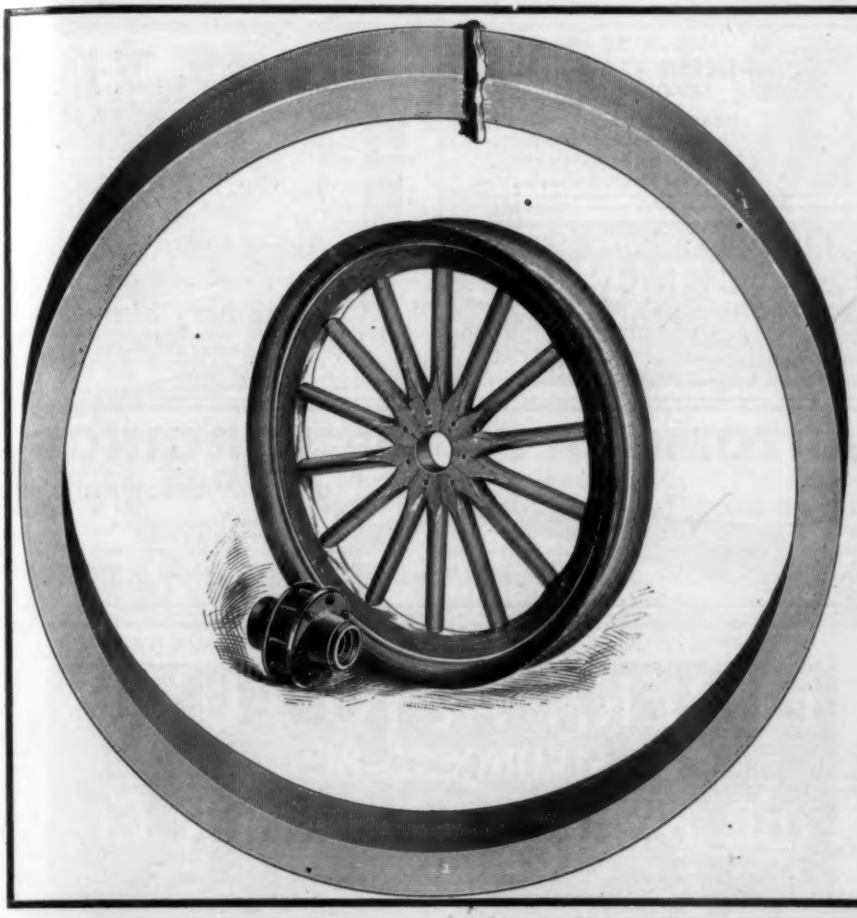

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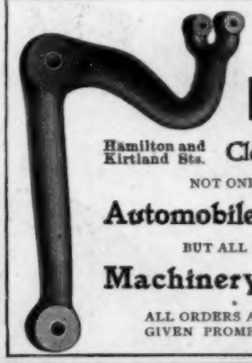

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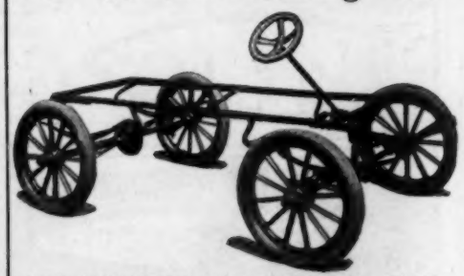

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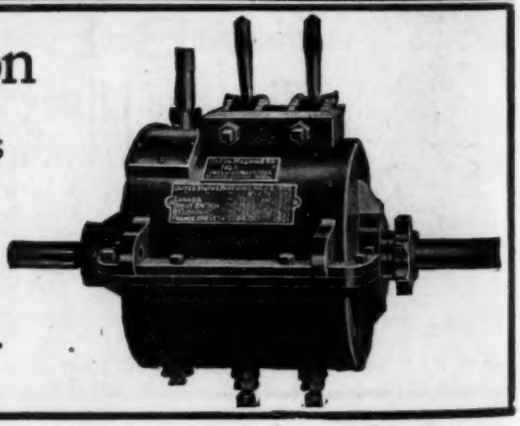

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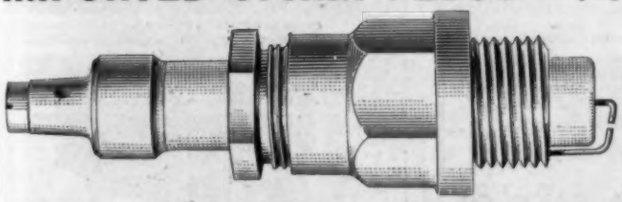

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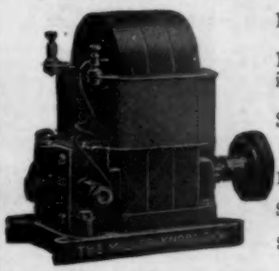

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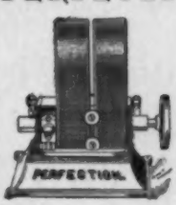

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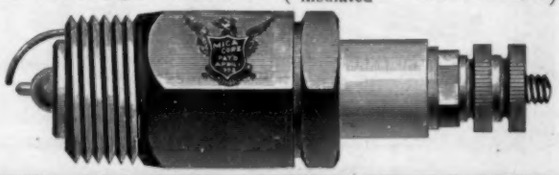

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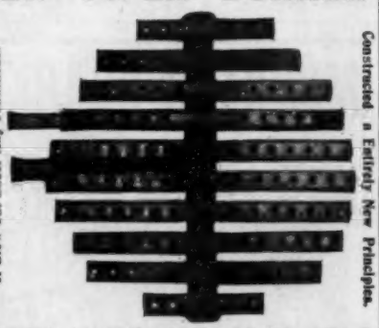

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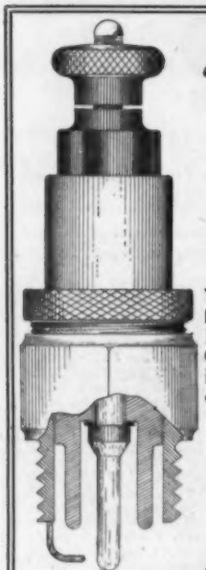

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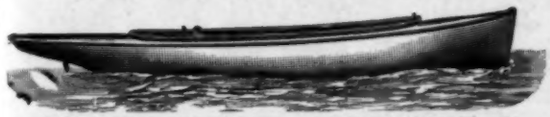

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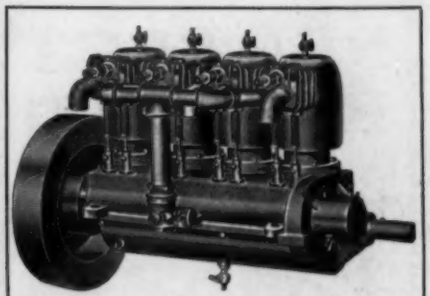

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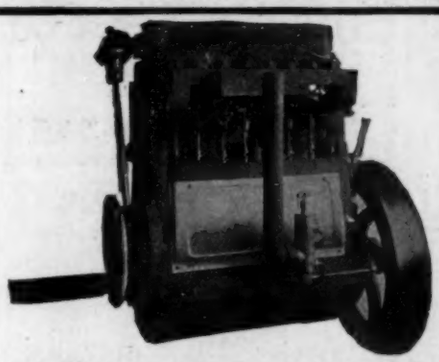

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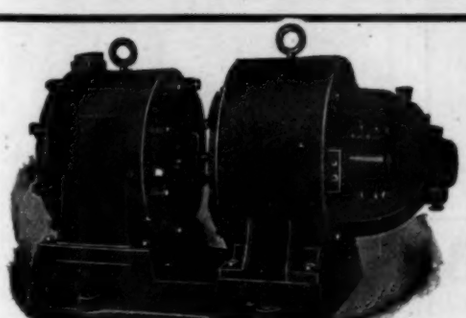

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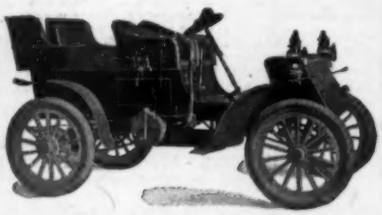

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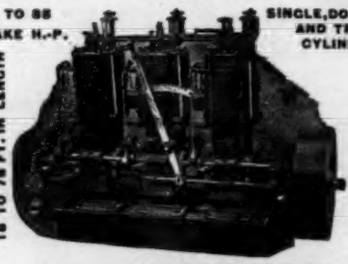

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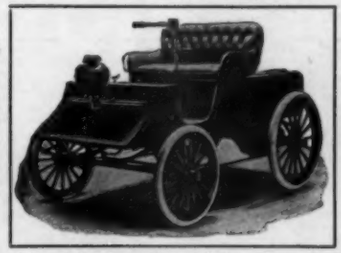

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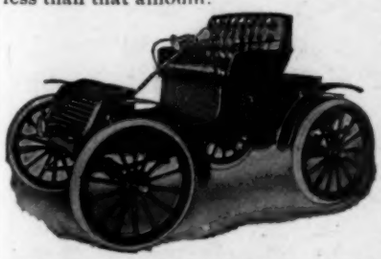

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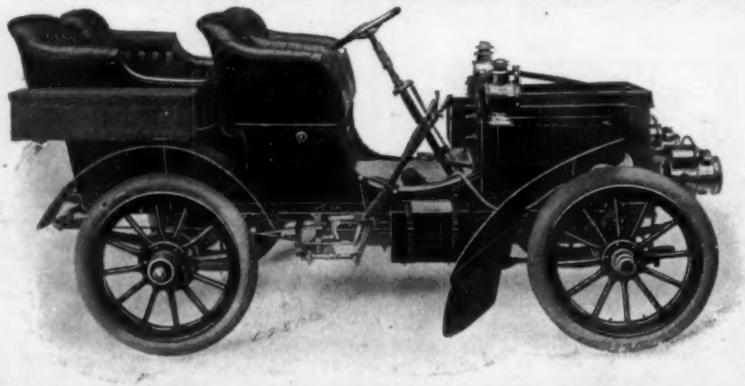

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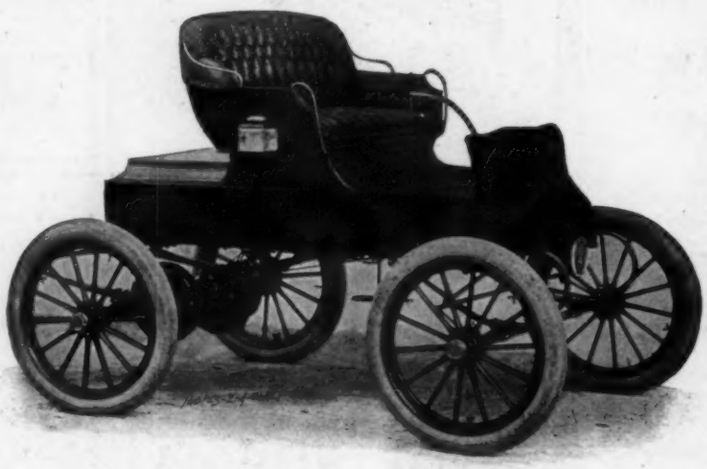

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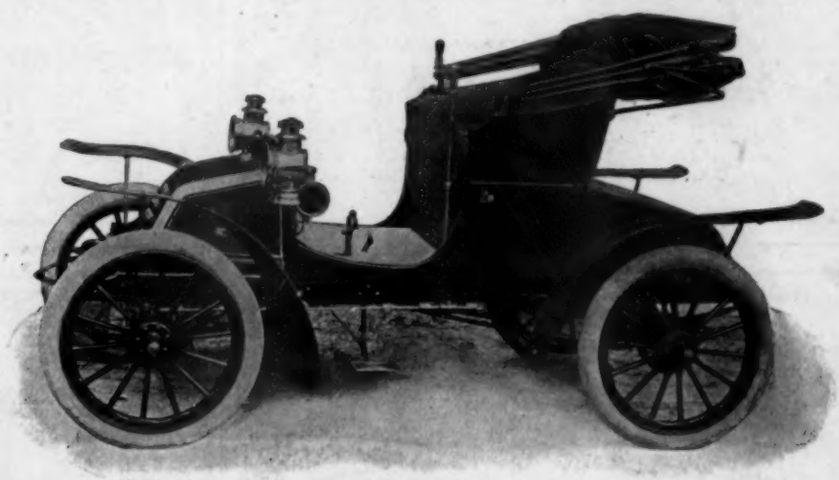

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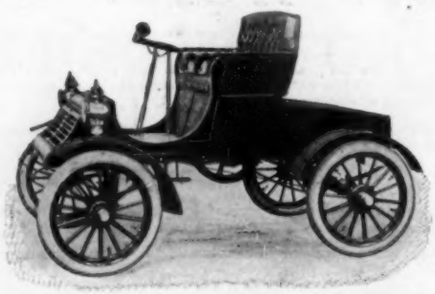

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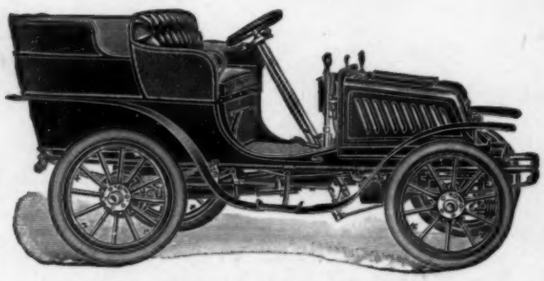

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of the necessary qualifications of a good automobile, you will be getting a good description of the

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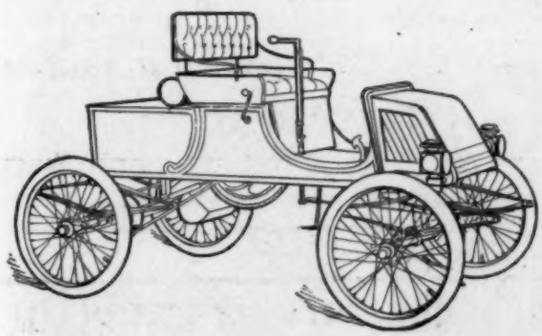

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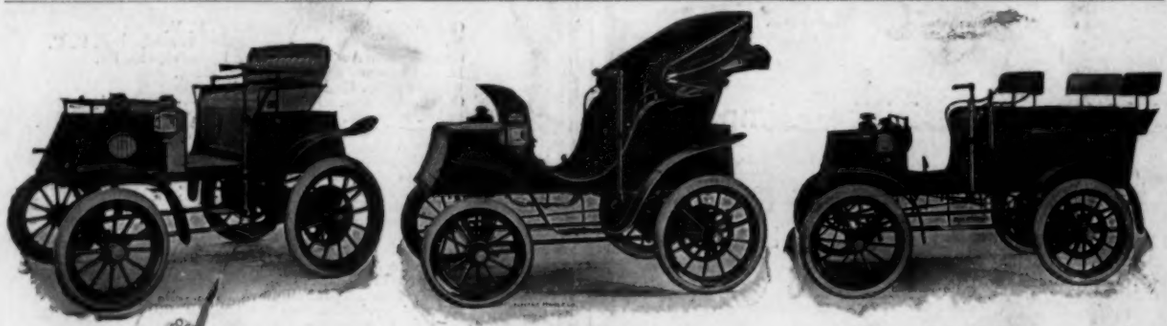

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